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DIAGNOSIS OF TIGHT MITRAL STENOSIS

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Recent advances in the surgical treatment of mitral stenosis have made the diagnosis of tight mitral stenosis important. Evidence is accumulating that mitral commissurotomy performed in patients with tight mitral stenosis is of benefit and can be performed with a comparatively low mortality in selected cases. Patients with mild mitral stenosis and with severe mitral insufficiency or aortic valvular lesions may present somewhat similar pictures, but would not be candidates for surgical treatment until such time as operative approaches to the correction of mitral insufficiency or aortic insufficiency and stenosis have proved their worth. Although there is a tendency, at present, to limit the operation to those patients who show tight mitral stenosis without significant associated lesions, it seems possible that correction of the mitral stenosis may be of value whenever it is severe, regardless of associated lesions. The purpose of this presentation is to describe the factors that are important in the diagnosis of tight mitral stenosis. Seventeen patients with this diagnosis were carefully studied clinically and by means of cardiac catheterization. These patients were subsequently operated on, and the presence of a tight mitral stenosis demonstrated. None of the mitral valves would admit the tip of the surgeon's index finger. Since the area of the finger tip was approximately 1 sq. cm., the valve areas were all less, often much less, than 1 sq. cm.

Other valvular lesions of minor degree were present in these patients but influenced the general picture little, if at all. Mitral insufficiency was frequently present but, in view of the small valve opening, was necessarily slight. Faint diastolic murmurs along the left border of the sternum were considered as indicating some aortic insufficiency, but no other evidences of this lesion were present. Some of these murmurs may have been due to pulmonary insufficiency. Tricuspid lesions were recognized in at least two cases and, in minor degree, may have been present in others. The important findings in these patients are shown in table 1 and are discussed below.

AUSCULTATION

The auscultatory findings (table 1, columns 4 through 8) are of major importance, and the diagnosis of tight mitral stenosis can be made in many cases on the basis of auscultation alone.

Murmurs.—For the diagnosis of mitral stenosis the characteristic mid-diastolic murmur, whether loud or faint, should be present. The murmur of mitral stenosis has the following characteristics:

1. It is best heard at the apex and when faint may be confined to a very small area. As the murmur becomes more intense, it is heard over a wider area; however, even when very intense, it may be confined to a relatively small area.

2. The murmur is best heard when the patient is recumbent and in the left lateral position. Even when it is very loud in this position, it may be heard poorly or not at all in the sitting position. Listening to a patient only in the sitting or standing position does not constitute a complete examination. When faint, the murmur may be best heard for several beats just after the patient has assumed the left lateral position or just after the patient returns to the recumbent position.

3. The murmur in its early stages is rather low-pitched and rumbling in character and therefore best heard with the bell of the stethoscope. To hear faint murmurs, one must hold the bell lightly against the skin because the intensity of the murmur is decreased by pressure. As the intensity of the murmur increases, it becomes harsher and may be heard equally well with the bell or the diaphragm.

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4. In the early stages the murmur of mitral stenosis is entirely mid-diastolic. As the stenosis progresses or the heart rate increases, the murmur, which begins in mid-diastole, now continues to the first heart sound, often with a presystolic accentuation. Rarely does a presystolic murmur occur without a mid-diastolic murmur. These cases must be regarded with suspicion, because various changes occurring about the time of the first heart sound may give the impression of a presystolic murmur. A faint mid-diastolic murmur associated with a loud presystolic murmur may indicate a valve that is moderately stenotic but not as tight as in those cases in which the murmur is loud from its onset in mid-diastole. In the presence of auricular fibrillation the duration of the murmur may be an index of the severity of the stenosis.

5. Tachycardia due to exertion or other causes makes the murmur more evident.

In tight mitral stenosis the mid-diastolic murmur is usually loud or moderately loud. Occasionally it may be faint, and rarely it may be absent. The position of the heart and the presence of pulmonary emphysema may at times account for a faint murmur. Probably more important is the drop in pressure in the left auricle and the slowing of the blood flow associated with pronounced degrees of right heart failure. Thus a patient who has a moderately loud mid-diastolic murmur before failure occurs may have only a faint murmur with the onset of fibrillation and/or failure. In patients with known rheumatic heart disease who are in failure and do not have evidence of active rheumatic fever or a significant aortic valvular lesion to account for the failure, the diagnosis of tight mitral stenosis may tentatively be made on the basis of the other findings described below, even if the mid-diastolic murmur is faint.

TABLE 1.—*Results of a Study of Seventeen Patients with Tight Mitral Stenosis*

			Findings on Auscultation					Roentgen Findings			Cardiac Output (Index)		Pulmonary Arterial Pressure					
Patient	Age	Sex	Mitral Diastolic Murmur*	Apical Systolic Murmur*	First Sound at Apex †	Second Pulmonic Sound †	Early Diastolic Murmur, Third Left Interspace*	Left Atrium ‡	Pulmonary Artery ‡	Left Ventricle ‡	Rest	Exercise	Rest§		Exercise		Functional Status (Class) §	Hemoptysis ‖
E. B.	40	F	++++	++	N	A	0	+++	+	+	3.84 (2.46)	3.54 (2.27)	40/13	26	46/23	31	4	0
T. B.	50	M	++++	0	MA	N	0	++	+++	+	2.54 (1.39)	3.29 (1.80)	44/22	31	95/50	65	3	++++
D. A. B.	57	F	+++	++	A	..	0	++	++	++	3.80 (2.54)	5.40 (3.62)	58/26	42	109/73	87	3	0
M. D.	47	M	++ to +++	++	A	N	0	+++	++	N	3.40 (2.06)	4.44 (2.70)	40/16	24	48/24	32	3	0
R. J. D.	26	M	++++	0	MA	MA	++	+++	++	N	4.17 (2.24)	5.62 (3.06)	41/22	28	99/55	70	3	0
F. C. D.	39	M	+++++	++	N	A	++	++++	+++	+	2.87 (1.73)	3.42 (2.07)	53/24	37	102/54	70	4	+
N. D.	38	F	+++	++	A	A	0	++	++	N	3.41 (2.05)	3.68 (2.20)	64/24	33	132/48	76	3	++++
E. R. H.	39	F	++ to +++	++	N	N	0	+++	N	N	2.56 (1.64)	3.78 (2.42)	21/ 6	15	50/26	34	4	0
E. M.	35	F	+++	++	A	A	+++	+++	++++	+	....	....	90/42	60	.....	..	3	++
B. L. P.	53	F	++++	++	A	N	++	+	+	+	3.26 (1.98)	3.60 (2.18)	48/18	29	60/38	45	3	++++
C. L. R.	50	M	+++	++	A	A	+	+++	++	N	2.87 (1.70)	3.97 (2.35)	48/22	33	83/58	66	3	+
G. R.	38	M	++++	+	A	N	0	++++	+++	N	4.74 (2.84)	5.18 (3.10)	54/31	40	83/47	62	4	++
H. S.	42	M	++++	++	MA	MA	++	+++	+++	N	4.10 (2.40)	3.71 (2.18)	72/32	42	90/46	64	4	+++
M. S.	39	F	++++	++	MA	MA	0	+++	+++	N	1.50 (1.08)	....	72/42	52	.....	..	4	0
L. S.	50	F	+++	++	MA	A	0	+++	++	+	2.81 (1.84)	5.92 (3.87)	26/10	17	59/30	40	3	0
H. M. W.	33	F	++ to +++	+	N	MA	++	++	++	N	3.64 (2.32)	5.11 (3.25)	33/15	21	72/37	49	3	0
C. W.	26	M	++++	+	A	A	0	+++	++	+	4.10 (2.50)	3.90 (2.40)	58/28	40	84/44	60	3	+++

* No murmur, 0; very faint, +; faint, ++; moderately loud, +++; loud, ++++; very loud, +++++; extremely loud, ++++++.
† N, normal; A, accentuated; MA, markedly accentuated.
‡ Enlargement graded + to ++++. N, normal.
§ According to classification of the American Heart Association.
‖ Graded + to ++++ on the basis of number of episodes.

When a loud mid-diastolic murmur is heard, the systolic murmur of mitral insufficiency is usually absent or faint, and only occasionally is it moderately loud. The murmur of slight or moderate mitral insufficiency is high-pitched and blowing and is best heard at the apex with the diaphragm of the stethoscope. If the diastolic murmur is loud and the systole is short, the systolic murmur may be difficult to hear. In general, it is true that the louder the systolic murmur the less intense the diastolic murmur, and vice versa. In the patients of our series the stenosis was so marked that there could not have been much insufficiency, and in no instance was there a loud systolic murmur. If there is enough insufficiency to give a loud systolic murmur, the stenosis is likely to be of only

mild or moderate degree and the insufficiency is likely to be the more important lesion. Since insufficiency is often aggravated by the operation, patients whose insufficiency is judged to be the more important lesion would not appear to be candidates for the operation at present.

The systolic murmur of tricuspid insufficiency often becomes evident as right heart failure develops and should not be confused with the murmur of mitral insufficiency. The murmur of tricuspid insufficiency is of maximum intensity just to the left of the lower end of the sternum and fades out laterally, so that it is usually faint at the point of maximum intensity of the mid-diastolic murmur, while the murmur of mitral insufficiency is loud at the apex and well heard laterally. When the tricuspid insufficiency is marked, cervical venous pulsation and liver pulsation may be of help in the diagnosis.

Many of the patients had a high-pitched, early diastolic murmur along the left border of the sternum, best heard with the diaphragm of the stethoscope. This murmur was usually considered to be indicative of aortic insufficiency, although in some instances it might have represented pulmonary insufficiency. This murmur, even when well heard at the apex, should not be confused with the murmur of mitral stenosis, because of the difference in timing, pitch, and points of maximum intensity.

Heart Sounds.—The intensity of the first heart sound is usually increased. It is occasionally diminished, but the presence of a markedly diminished first heart sound should be regarded with suspicion, for it is more likely to occur when mitral insufficiency is the important lesion. Accentuation of the second heart sound in the pulmonic area is of importance as an indication of increased pressure in the pulmonary artery. However, accentuation of the pulmonic second sound does not invariably occur when pulmonary arterial hypertension is present. It may be absent because of the position of the artery, the presence of pulmonary emphysema, or other causes. The opening click of the mitral valve was present in several of our patients, but its value as a diagnostic sign for tight mitral stenosis could not be evaluated.

FLUOROSCOPIC AND ROENTGENOGRAPHIC OBSERVATIONS

Next in importance to the auscultatory findings in the diagnosis of tight mitral stenosis is the roentgenologic evidence of the presence of left auricular enlargement and the absence of left ventricular enlargement. Left auricular enlargement was marked in almost every case and was well seen in both the posteroanterior view and in the left lateral esophogram. It was well seen during fluoroscopic examination when the points of opposite pulsation along the left cardiac contour could easily be determined. If orthodiascopic study is made, the exact length of the auricular segment may be determined and a measure of the degree of left auricular enlargement obtained. This segment normally does not exceed 2.2 cm. in length [1]; in our patients it was often 4.5 to 5 cm. in length. The enlargement of the left auricle is of importance as an indication of the degree of mitral stenosis only when taken in conjunction with the other criteria, especially those that rule out marked mitral insufficiency. Although the degree of auricular enlargement in mitral stenosis may often be pronounced, similar degrees of enlargement may occur in mitral insufficiency and the most pronounced enlargement is often seen in patients with fairly severe mitral insufficiency associated with moderate stenosis.

The left ventricle (as judged by cardiac contour) was considered to be not enlarged in nine cases and possibly slightly enlarged in eight cases. The absence of left ventricular enlargement is reflected in the absence of pronounced increases in transverse diameter in a group of patients all showing evidence of advanced heart disease. The cardiothoracic ratio was 50% or greater in only 10 patients. The transverse diameter of the heart was greater than the transverse diameter predicted on the basis of height and weight [2] in 16 patients, and the average increase was 25%. Although the absence of left ventricular enlargement is a factor against severe mitral insufficiency, its presence could at times be due to aortic valvular lesions or arterial hypertension.

The pulmonary artery and its major branches were considered to be enlarged in almost every instance. The prominence of the pulmonary artery served as a rough index of the pulmonary arterial pressure, since patients with the most prominent arteries had the highest pulmonary arterial pressures. As a result of the increased prominence of the left auricular appendage and pulmonary artery, all the patients showed straightening or even bulging of the left cardiac contour, the so-called mitral configuration.

Enlargement of the right ventricle was considered to be present in a majority of instances but was much more difficult to assess. The lung fields showed increased vascularity in all but two cases, with prominence of the vascular pattern, nodular densities, and, in several instances, multiple small calcifications.

ELECTROCARDIOGRAPHIC OBSERVATIONS

Since in the course of mitral stenosis an increased pressure develops in the left auricle and later in the right ventricle, these chambers of the heart often show hypertrophy and enlargement. In 16 patients we made a detailed study of the electrocardiogram in order to determine its value in the detection of these changes.

Left auricular hypertrophy and enlargement may be evidenced by P wave changes or by the presence of auricular fibrillation, for auricular fibrillation in rheumatic heart disease usually indicates the presence of a large left auricle under strain. Auricular fibrillation was present in 7 of the 16 electrocardiograms, and there was one instance of persistent auricular flutter. P wave changes occurred in all the remaining eight patients, with regular rhythm. These changes consisted of broad notched P waves, most clearly seen in leads 1 and 2. Increased amplitude of the P waves occurred at times but was not striking. This is in accord with the observation that tall P waves are more likely to occur with right auricular hypertrophy than with left.[3] The finding of either P wave

1. Kurtz, C. M.: Orthodiascopy: An Analysis of over Seventeen Hundred Cases, New York, The Macmillan Company, 1937.
2. From the table of Ungerleider and Clark.
3. Berliner, K., and Master, A. M.: Mitral Stenosis: A Correlation of Electrocardiographic and Pathologic Observations, Arch. Int. Med. **61**: 39 (Jan.) 1938.

changes or auricular fibrillation is in accord with the roentgenographic observation of enlargement of the left auricle in all 16 cases.

Electrocardiographic criteria for right ventricular hypertrophy have been defined by Sokolow and Lyon,[4] who used the unipolar and precordial limb leads, and by Schack, Rosenman, and Katz,[5] who employed only the unipolar limb leads. These criteria are listed in table 2, together with the data obtained from the electrocardiograms of our patients. A, B, C, and D are the criteria given by Sokolow. Under A are given the measurements for the voltages of the R and S waves in the precordial and unipolar limb leads and the various sums and ratios of these voltages. It can be seen that in only a few of our cases was the presence of abnormalities shown in these measurements, the greatest number being 5 patients out of the 16 who showed an R:S ratio in V_1 greater than 1 (criterion A-9). Four of these five patients also showed delayed ventricular activation time in V_1 or V_2 (criterion B). Changes in the RS-T segment and T waves occurred in only two (criterion C).

TABLE 2.—*Evidence of Right Ventricular Hypertrophy in Patients with Mitral Stenosis*

	Total +	Total 0
A. Voltage of R and S waves		
1. R wave in V_1 7 mm. or greater	3	13
2. S wave in V_1 less than 2 mm.	3	13
3. S wave in V_5 or V_6 7 mm. or greater	3	13
4. R in V_1 + S in V_5 greater than 10.5 mm.	3	13
5. R in V_5 less than 5 mm.	0	16
6. Ratio of R:S in $V_5 = 1$ or less	2	14
7. R in $_aV_F = 5$ mm. or more	0	16
8. Ratio R:S in V_5 / Ratio R:S in $V_1 = .4$ or less	4	12
9. Ratio R:S in V_1 greater than 1	5	11
B. Delayed ventricular activation time between 0.04 — 0.07 sec.		
In V_1	3	13
In V_2	4	12
C. Depressed RS-T and inversion of the T wave		
In V_1	1	15
In V_2	3	13
In V_3	2	14
In $_aV_1$	0	16
In $_aV_F$	0	16
D. Right axis deviation greater than + 110 degrees or more	2	..
E. Sum of ratios R:S in $_aV_1$ and $_aV_F$ Less than 13	3	13
Ratio R:S in $_aV_F$ greater than .7	3	13
Total voltages in $_aV_F$, $_aV_1$ and $_aV_F$ greater than 42	1	15

No. of positive criteria shown by a given patient	0	1	3	7	10	12
No. of patients showing this no. of criteria	5	6	1	2	1	1

The changes in the unipolar limb leads in right ventricular hypertrophy given by Schack, Rosenman, and Katz [5] are shown in table 2 (criterion E). Only six patients showed abnormal values in any one of the criteria presented by Schack and his co-workers, no patient having more than one abnormal value.

The electrocardiographic position of the heart in these patients was vertical in 11, semi-vertical in 2, and intermediate in 3. There was accordingly right axis deviation (axis greater than +90 degrees) in six patients, and a tendency to right axis deviation (+80 to +90 degrees) in three patients. The remaining seven showed a normal axis. Although a vertical electrocardiographic position of the heart is of no significance when the heart size is normal, its occurrence in patients with cardiac disease and enlarged hearts is much more significant. In mitral stenosis, whether as a result of greater electrical potentials arising from the hypertrophied right ventricle or as a result of changes in the anatomic position of the heart, the electrocardiographic position of the heart tends to be vertical. In the case in which the enlargement of the heart is mostly left ventricular, the electrocardiographic position tends to be horizontal. The occurrence of a horizontal electrocardiographic position of the heart and corresponding left axis deviation suggests the presence and functional importance of mitral insufficiency or aortic valvular lesions rather than tight mitral stenosis.

Table 2 shows that in only two patients did the electrocardiogram exhibit abnormalities in over one-half of the criteria that are said to be of value in the detection of right ventricular hypertrophy. Only four (25%) of the patients had abnormalities in five or more of the criteria. One must assume either that very little right ventricular hypertrophy existed in these patients or that the electrocardiogram is of limited value in the detection of right ventricular hypertrophy until it is severe.

Postmortem findings in two patients showed right ventricular walls 4 to 6 mm. and 5 to 6 mm., respectively, in thickness, approximately twice that of the normal heart; yet the electrocardiograms met only 3 and 1, respectively, of the 20 criteria. All these patients had a long history of rheumatic heart disease with mitral stenosis, and the mean pulmonary arterial pressures were increased in all but three at rest and in all during mild exercise. It is reasonable, therefore, to conclude that right ventricular hypertrophy existed but that it apparently has to be severe in order to be detectable by electrocardiography.

CLINICAL DATA

Functional Status.—The occurrence of no limitation or slight limitation of physical activity would seem unlikely in the presence of a tight mitral stenosis of the type considered here. Although these patients get along remarkably well at rest, the inability to increase the cardiac output to any significant degree prevents their doing well on exertion. Some of them may for a while be able to increase their cardiac output by rather pronounced increases in pulmonary arterial pressure and thus apparently are in class 2.[6] They will, however, show a gradual deterioration in their ability to do physical activity and soon are clearly in class 3, that is, less than ordinary physical activity will cause discomfort.

Many patients with mitral stenosis get along well for years, for example, women who bear many children and

4. Sokolow, M., and Lyon, T. P.: The Ventricular Complex in Right Ventricular Hypertrophy as Obtained by Unipolar Precordial and Limb Leads, Am. Heart J. **38**: 273 (Aug.) 1949.

5. Schack, J. A.; Rosenman, R. H., and Katz, L. N.: The aV Limb Leads in the Diagnosis of Ventricular Strain, Am. Heart J. **40**: 696 (Nov.) 1950.

6. American Heart Association classification.

patients who lead active lives and die at an advanced age of unrelated causes. These patients usually have mitral stenosis of only moderate degree. A valve area of 1.5 sq. cm. or more permits a cardiac output compatible with a rather active life.[7] Such valve areas are considerably less than the normal 4 to 6 sq. cm., yet greater than the mitral valve areas of our patients.

Attacks of Paroxysmal Auricular Fibrillation or Tachycardia.—Although these occur in many types of cardiac disease, patients with mitral stenosis and enlarged left auricles are particularly prone to have them and are often more ill with these attacks than are other cardiac patients. Persons with mitral stenosis tolerate tachycardia very poorly, because of their dependence on a diastolic filling period adequate for left ventricular filling. As the tachycardia shortens diastole, left ventricular filling decreases markedly and the cardiac output, low initially, falls to even lower levels. It is not uncommon for marked hypotension or anginal pain to develop during these attacks in such patients.

Episodes of Pulmonary Edema and Congestive Failure.—In a patient with the auscultatory findings of mitral stenosis and with only moderate cardiac enlargement, the occurrence of episodes of pulmonary edema or congestive failure suggests that the mitral stenosis is tight. These episodes are less significant when there is pronounced cardiac enlargement. Pulmonary edema is often precipitated by tachycardia.

Hemoptysis.—Hemoptysis is a classical sign of mitral stenosis, but its value as an index of the severity of mitral stenosis depends on the size of the heart. Hemoptysis in a patient with a heart that is only moderately enlarged suggests the presence of a tight mitral stenosis. Arterial embolization is not necessarily suggestive of tight mitral stenosis.

CARDIAC CATHETERIZATION

This procedure is widely used at present, and its importance in selection of patients for mitral commissurotomy has been emphasized. Valuable physiological data are certainly obtained by catheterization, for example, the cardiac output and index at rest and during exercise, the pulmonary arterial pressures at rest and during exercise, and the pulmonary "capillary" pressure. It is our opinion, however, that the information obtained from cardiac catheterization is of limited value in the determination of whether a tight mitral stenosis is present. Where the diagnosis is in doubt before catheterization, it is rarely made by catheterization.

Cardiac Output.—The resting cardiac output and cardiac index are decreased, often markedly so, in tight mitral stenosis. The average cardiac index in our patients was 2.05. Inasmuch as two factors, the mitral stenosis and cardiac decompensation, may play a role in decreasing cardiac output, the relative importance of each factor must be assessed in any given case. When the heart is of nearly normal size and cardiac decompensation is not present to a significant degree, the cardiac output may reflect the severity of the mitral stenosis.

The resting cardiac output in patients with mitral insufficiency is also reduced and has in fact been reported to be lower than in those with mitral stenosis.[8] However, decrease in cardiac output due to cardiac decompensation may have been involved.

These patients show an inability to increase significantly the cardiac output during exercise. Whatever increase does result is due to a decided elevation of pulmonary arterial pressure. Tachycardia, by decreasing the diastolic filling period, tends to decrease the cardiac output. This effect may outweigh the effect of increased pulmonary arterial pressure, resulting in a decreased output during exercise. Inability to increase cardiac output is also present in patients with mitral insufficiency and in patients with cardiac decompensation due to other causes.

Pulmonary Arterial Pressure.—The pulmonary arterial pressure is usually increased at rest but may be within normal limits even in the presence of tight mitral stenosis with diminished cardiac output. Apparently patients show various methods of compensating for their handicap; in some the output is maintained by raising of the pulmonary arterial pressure, while others manage surprisingly well on very low cardiac outputs and low pulmonary arterial pressures.

The pulmonary arterial pressure rises rapidly and severely with slight exertion, the systolic pressure frequently doubling. The pressure increases shown in column 15 in table 1 resulted from exertion that was usually very mild, because of the functional status of the patients. An increase in pulmonary arterial pressure during exertion occurs in the presence of various cardiac conditions and is not diagnostic of mitral stenosis.

Pulmonary "Capillary" Pressure.—When the tip of the catheter is advanced through the pulmonary arterial tree until it occludes a branch, the pressure that may then be recorded has been shown to be a close approximation of the pulmonary capillary pressure.[9] This pressure also bears a definite relationship to left auricular and pulmonary venous pressures. Evidence of mitral regurgitation when this is severe may at times be seen in the pulmonary "capillary" pressure tracing. Such evidence would be of value in excluding the diagnosis of tight mitral stenosis.

Calculation of Mitral Valve Area by Formulas.—Gorlin and Gorlin have presented a formula for calculation of the mitral valve area in cases of mitral stenosis.[7] This formula states that the mitral valve area in square centimeters is equal to

$$\frac{\text{mitral valve flow in cubic centimeters per second}}{31\sqrt{\text{"PC"} - 5}}$$

where "PC" is the pulmonary "capillary" pressure. Mitral valve flow in cubic centimeters per second is calculated by dividing the cardiac output in cubic centimeters per minute by the diastolic filling period in seconds per minute. The diastolic filling period is estimated from the brachial arterial pressure-pulse contours. These authors find that the valve areas calculated from this formula

7. Gorlin, R., and Gorlin, S. G.: Hydraulic Formula for Calculation of the Area of the Stenotic Mitral Valve, Other Cardiac Valves, and Central Circulatory Shunts, Am. Heart J. **41**: 1 (Jan.) 1951.

8. Draper, A., and others: Physiologic Studies in Mitral Valvular Disease, Circulation **3**: 531 (April) 1951.

9. Hellems, H. K.; Haynes, F. W., and Dexter, L.: Pulmonary "Capillary" Pressure in Man, J. Appl. Physiol. **2**: 24 (July) 1949.

correlate very well with the valve areas found at operation or autopsy.

To derive their formula, Gorlin and Gorlin made a number of assumptions, some of which probably introduce little error, while others may introduce errors of a magnitude sufficiently great to make the formula of questionable value. By assuming a fixed value for "PC" and using cardiac output instead of mitral valve flow, a simplified formula may be derived that requires only the resting cardiac output. Thus,

$$\text{mitral valve area} = \frac{8 + (\text{C.O.} - 3)\,5}{14}$$

where C.O. is resting cardiac output in liters per minute.

In six of our patients in whom the pulmonary "capillary" pressure was determined, the mitral valve areas by the formula of Gorlin and Gorlin were calculated as 0.5, 0.7, 0.7, 0.9, 0.6, and 0.8 sq. cm. With the use of the simplified formula given above, the corresponding values were 0.5, 0.5, 0.7, 1.0, 0.4, and 0.8. The similarity is striking. Recalculating the data of Gorlin and Gorlin by means of the simplified formula given above, one finds that in 16 of their 21 cases the simplified formula gives a value within 0.2 sq. cm. of the value obtained with their formula.

The purpose of these comparisons is not to propose another formula for calculation of the mitral valve area, but rather to point out, first, that it may be incorrect to make several broad assumptions and then employ measurements that are too fine, and, second, that the important variable in the formula is apparently the cardiac output.

AMYL NITRITE AND THE VALSALVA TEST

Amyl nitrite inhalation has been suggested as a test for tight mitral stenosis. The test depends on the production of tachycardia, which, as has been mentioned, these patients tolerate poorly. Syncope will, therefore, frequently follow amyl nitrite inhalation in patients with mitral stenosis. Without other data the test, of course, means nothing. If the diagnosis is definite before the test is done, the test may be of a little value in confirmation.

A decided rise in systemic arterial pressure, which results in bradycardia, normally follows the Valsalva maneuver. This post-Valsalva hypertension depends in part on the increased venous return and cardiac output following the fall of the intrathoracic pressure to normal. Since the output of the left ventricle cannot increase to any degree in patients with tight mitral stenosis, the rise in arterial pressure and the resulting bradycardia do not occur or tend to be less pronounced. The Valsalva maneuver has therefore been suggested as a test for tight mitral stenosis.[10] Further study has shown that post-Valsalva failure of the arterial pressure to increase and failure of bradycardia to develop may be seen in other conditions and that the test has no great or specific value.

SUMMARY

The diagnosis of tight mitral stenosis can be made clinically on the basis of the following findings:

1. The presence of the typical diastolic murmur of mitral stenosis. This murmur is usually loud or moderately loud but may occasionally be faint.

2. The absence of a loud apical systolic murmur, indicative of mitral insufficiency. A faint systolic murmur is frequently present, and occasionally there may be a moderately loud systolic murmur.

3. The presence of an enlarged left atrium. This is usually evident on fluoroscopic or roentgenographic examination. It is also evident in the electrocardiogram as a change in the P waves or by the presence of auricular fibrillation.

4. The absence of left ventricular enlargement. This is determined by the fluoroscopy and roentgenogram. The absence of a horizontal electrocardiographic position of the heart and left axis deviation is corroborative. In the presence of a significant aortic valvular lesion or long-standing hypertension, there may be some left ventricular enlargement.

In the presence of the above findings, valuable corroborative findings are (1) a functional status of class 3 or 4, (2) evidence of right ventricular hypertrophy on fluoroscopic examination or in the roentgenogram or the electrocardiogram, and (3) episodes of pulmonary edema, congestive failure, or hemoptysis in the presence of a heart of only moderately increased size. Cardiac catheterization furnishes interesting data but is usually of little value in the diagnosis of tight mitral stenosis.

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10. Goldberg, H.; Elisberg, E. I., and Katz, L. N.: The Effects of the Valsalva-Like Maneuver upon the Circulation in Normal Individuals and Patients with Mitral Stenosis, Circulation 5: 38 (Jan.) 1952.

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Presymptomatic Medicine.—Screening as a routine function of practicing physicians represents a departure in activities to which the profession as a whole has not completely oriented itself. . . . For centuries the public has looked to the medical profession for the cure of diseases and the relief of suffering, to tax-supported agencies for sanitation and preventive medicine. The search for diseases in their earliest stages is an extension of preventive medicine toward medical practice, or an extension of medical practice toward preventive medicine—dependent upon viewpoint. It represents a new form of activity which might be termed "diagnostic preventive medicine," "preventive diagnosis," or "presymptomatic medicine." The field of presymptomatic medicine has not been sharply delineated as a practical challenge for physicians. . . .

Adequate "screening" by the medical profession has been hampered (*a*) by the traditional role of physicians as healers, (*b*) by economic factors, (*c*) by lack of interest in the "well patient," (*d*) by the low yield of mass screening technics, (*e*) by the faulty logic of medical professors who have engendered confusion between "screening" and the diagnosis of a presenting complaint, and (*f*) by the let-George-do-it philosophy of therapeutic specialists. If "screening" is to be carried out in routine medical practice, the entire profession must face the issue, and each physician must be prepared to carry his share of the burden. Moreover, it is essential that the medical profession as a whole develop a new attitude toward each patient, (*a*) as an individual with a chief complaint, and (*b*) as a person to be "screened" for unsuspected chronic diseases. In his time-honored role as healer the physician must listen intently to the chief complaint of the sufferer and take whatever steps historical, physical or laboratory are required to arrive at the proper diagnosis. As a practitioner of presymptomatic medicine he must carry out such additional steps as are needed to exclude a reasonable likelihood of the existence of any threatening entity.—Benjamin V. White, M.D., Practical Diagnosis in Preventive Geriatrics, *Geriatrics*, April, 1952.

COMMISSUROTOMY FOR MITRAL STENOSIS

TECHNIQUE FOR PREVENTION OF CEREBRAL COMPLICATIONS

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One of the most tragic complications occurring in a case of mitral stenosis is cerebral embolization. In those cases in which the condition does not prove fatal, there is usually a long period of invalidism and not infrequently a permanent residual paralysis or personality change. With present generally accepted medical management, such vascular accidents are not completely avoidable, especially in cases with associated auricular fibrillation. The daily use of anticoagulants such as bishydroxycoumarin (dicumarol®) to maintain a persistent state of relative incoagulability of the circulating blood is an incomplete and none too satisfactory method of protection against embolization in cases of mitral stenosis. The patient is thereby converted into a "bleeder," with the constant risk of serious hemorrhage should he sustain a slight wound from any cause.

Logically, the best protective measure against the formation of auricular thrombi and the occurrence of embolization is the early surgical attack on the ultimate causal factor, mitral stenosis. Operation in the early stages of the disease would eliminate the possibility of blood stagnation, and the common site of thrombus formation, the atrial appendage, would be obliterated. There will probably be a considerable lapse of time before the medical profession generally accepts the philosophy of aggressive surgical attack in what has formerly been considered a chronic medical illness. Until the time comes when early surgery is universally accepted, we shall continue to have the problem of the thrombosed auricular appendage and its resulting emboli and must continue in our efforts to solve it by presently acceptable means.

Theoretically, amputation or ligation of the thrombosed auricular appendage would prevent peripheral emboli. Experimentally, this was proved to be an adequate solution by Hellerstein, Sinaiko, and Dolgin.[1] To us, this solution appears to be an oversimplification. While the majority of fresh, soft thrombi are located entirely within the left auricular appendage, there are many cases in which long streamers or eel-like extensions of the thrombi extend well into the main auricular cavity. These could easily be dislodged during ligation or amputation of the auricular appendage. The commoner type of thrombus encountered in the auricular appendage at operation is firm, well organized, and attached securely to the trabeculae and to other irregularities within the lumen. It is not unusual in such cases to find an extension of this organized thrombus in the form of a large flat mass, coating or lining the lateral wall of the auricle to which it is firmly adherent. The entire thrombus then assumes the shape of a mushroom, with the stem in the auricular appendage. While it would appear unlikely that embolization could be produced by such an old well-organized thrombus, auricular appendectomy has been practiced for such. In some cases a considerable portion of the auricular lumen is filled with a large thrombus, perhaps poorly organized (fig. 1).

When arterial embolization occurs during the course of medical treatment of mitral stenosis, it is generally accepted as unavoidable by the patient, the family, and the physician. However, when it occurs during or immediately after commissurotomy, it is inevitably and correctly attributed to surgical intervention. Commissurotomy can never attain general and complete acceptance until this complication is largely eliminated.

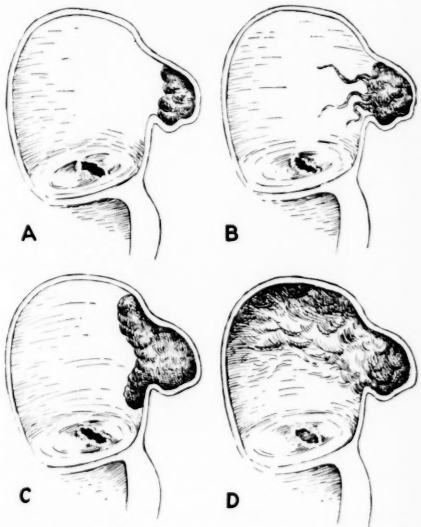

Fig. 1.—Thrombosis of the auricular appendage. *A*, limited to the appendage. *B*, associated with eel-like streamers of thrombus floating in the true auricular cavity. *C*, mushroom-like thrombus of appendage with cap lining the auricular wall (usually well organized). *D*, extensive intra-auricular thrombosis with varying degrees of organization.

While a large portion of arterial emboli occurring during medical treatment for mitral stenosis lodge in vessels of the extremities and abdominal viscera, we have seen no such localization occur in a series of 235 surgically treated patients. However, we know of several cases of arterial embolization to the lower extremities or to the bifurcation of the aorta occurring in the practice of other operators during the performance of commissurotomy.

1. Hellerstein, H. K.; Sinaiko, E. S., and Dolgin, M.: Amputation of Canine Atrial Appendages, Proc. Soc. Exper. Biol. & Med. **66**: 337 (Nov.) 1947.

This complication is evidently less common than cerebral embolism occurring during surgery, is a less serious threat to life and health, and is more easily treated. In this series, there were 12 instances of cerebral embolization. We do not wish to imply that most emboli released during the maneuvers of commissurotomy fail to traverse the aortic arch to enter the vessels beyond. Rather, we think that many of the probably more frequent emboli that do pass the aortic arch are of such small size that they usually remain unnoticed when they lodge peripherally. Particles of the same size coming to rest in the cerebral arterial pathways quickly make their effects evident.

It should be mentioned that thrombotic material in the atrium or its appendage is not the only source of these emboli. Some of them may be small pieces of calcium dislodged from the valve during commissurotomy. This

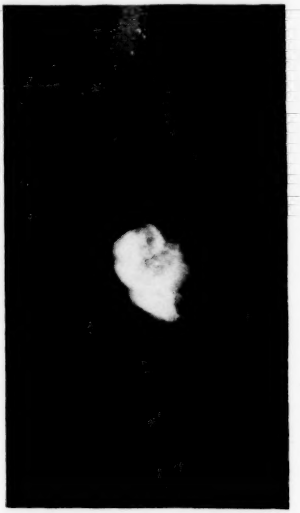

Fig. 2.—Cerebral embolism due to dislodgment of a bit of calcification from the stenotic valve orifice. Roentgenographic demonstration of calcium in brain post mortem (enlarged 4.7 diameters).

calcium may exist as loosely attached sand-like fragments on the edges of the valve orifice, as a block-like mass at either commissure, or as a general infiltration of the valve substance. We feel that such calcium fragments were responsible for the embolism in at least two cases in this series. In one, the calcium was actually demonstrated in a cerebral artery at autopsy (fig. 2). Our difficulties because of cerebral embolization, occurring in 5.1% of 235 cases in which commissurotomy was done and contributing to a sizable proportion of our mortality and morbidity, have led us to undertake a study of the problem in regard to its avoidance and treatment.

Of the 12 patients with this complication, 5 presented evidence of predominant involvement of the right side of the brain and 7 of the left. Three had bilateral involvement. All 12 patients presented definite neurological changes indicative of cerebral embolism, although 6 did not regain full consciousness postoperatively. The majority had signs and symptoms that suggested involvement of the middle cerebral artery or its branches. There was hemiplegia in nine cases and partial quadriplegia in three. There were eight deaths among the 12 cases, a mortality of 66.6%. In each case, we felt that death was directly related to this complication.

LOCALIZATION

The localization of the cerebral involvement corresponds essentially to that disclosed experimentally by Cone and Barrera.[2] The reason for this frequent involvement is not explained but may be assumed to be due to the more direct flow of blood into the middle cerebral artery than into the anterior or posterior artery. An embolus floating into the vertebral artery, if small, might well pass into one of the many branches of the basilar end and cause no trouble. If large enough to occlude the vertebral or basilar artery, death would rapidly ensue.

PATHOLOGICAL CHANGES

The pathological changes in the brains of the patients who were examined post mortem were extensive areas of softening with small hemorrhages interspersed. In no patient had the hemorrhagic areas coalesced to form a large discrete hematoma. The portion of brain involved in these middle cerebral emboli was typical. It demonstrated the reason for the more pronounced involvement of the arm, and, when the dominant hemisphere was affected, for the severe speech disturbance.

SYMPTOMS AND SIGNS

From a review of the anesthesia records we found that, during the course of surgery and anesthesia, the only early positive finding suggesting the incidence of cerebral embolization was a severe drop in systolic and diastolic blood pressures that rapidly (in 5 to 10 minutes) returned to a normal value for the patient during surgery.

It was the aim of the anesthesiologist to have the patients sufficiently awake at the completion of surgery so that simple commands for movement of the extremities might be obeyed. Therefore, prolongation of the unconscious state immediately after surgery, partial or complete paresis, aphasia, and pathological reflexes (Babinski sign and ankle clonus) were used for the clinical diagnosis of cerebral embolization. When seen shortly thereafter by the neurosurgeon, the patient usually had flaccid hemiplegia, with no motion in the arm and only flexor reflexes in the leg on painful stimulation. There was usually pronounced central facial weakness.

The diagnosis was established clinically in all cases. In three (25%), a spinal puncture was done to rule out the presence of intracranial bleeding. The pressure was found to be at the upper limits of normal. Death occurred in one case within five hours, and in the remaining fatal cases the patient survived 1, 1, 2, 5, 8, 40, and 53 days, respectively. In the last case, terminal subacute bacterial endocarditis developed.

Among the four patients who recovered, none became completely well. The use of the leg became essentially

2. Cone, W., and Barrera, S. E.: Brain and Cerebrospinal Fluid in Acute Aseptic Cerebral Embolism: Experimental and Pathologic Study, Arch. Neurol. & Psychiat. **25**: 523-547 (March) 1931.

normal in all. The arm was definitely impaired, but still partially useful in all. The speech function became adequate, but impaired, in three. The fourth patient at no time exhibited aphasia (left-sided paresis).

Our therapeutic efforts consisted, in the main, of the use of stellate ganglion blocks. Systemic heparinization was also carried out in one case, but the patient succumbed in 30 hours owing to rupture of a fulminating ulcer of the stomach. This case is to be reported in detail elsewhere.[3] The thought was entertained that it might be possible to pass a small catheter up the internal carotid artery and through it to aspirate the obstructing material. This proved impractical by cadaver studies, because of the S-shaped curve of the vessel before it communicates with the circle of Willis. It was further interdicted by the demonstration of Harvey and Rasmussen [4] that 30 minutes of ischemia produces irreparable brain damage.

Stellate ganglion blocks [5] were done if the patient was (1) unable to move all extremities, (2) aphasic, or (3) unconscious and unable to respond to painful stimuli. Either the anterior approach of Ochsner and DeBakey [6] or the anterolateral technique of Volpitto and Risteen [7] was used in each case. Horner's syndrome and/or warming of the upper extremity of the side on which the injection was made (opposite to the side of the paresis) constituted evidence of a satisfactory block. It became apparent early that, for adequate inhibition of sympathetic impulses from the stellate ganglion, the block would have to be repeated every two to four hours. To simplify the procedure, we adopted the following techniques.[8] A no. 15 Tuohy needle was inserted in the proper position, and through it a no. 4 radiopaque urethral catheter with stylet was threaded until it met resistance. The needle was then removed, leaving in place the catheter, which was secured by narrow strips of adhesive or by nonabsorbable suture. After removal of the stylet, a blunt no. 23 Leur-Lok needle was inserted into the distal end of the catheter. Five cubic centimeters of 1% intracaine® (beta-diethylaminoethyl-*p*-ethoxy benzoate hydrochloride) solution was then injected.

If a Horner's syndrome was not obtained within five minutes, administration of the dose was repeated. Failure of the second injection to inhibit sympathetic activity called for a bedside roentgenogram so that we might determine whether the catheter tip was in the proper position. If not, it was withdrawn and reinserted in the same manner and a roentgenogram was again taken. If the position was satisfactory, a three-way stopcock was attached to the no. 23 Leur-Lok needle. Connected to the stopcock were a flask containing 1% intracaine® and a 10 cc. Leur-Lok syringe. This allowed withdrawal of 5 to 10 cc. of the solution into the syringe for injection through the catheter every two to four hours as required to maintain the desired effect.

In addition to the ganglion blocks, an occasional dehydration regimen, mild sedation, and vasodilators were used. Eight of the patients were treated by stellate ganglion block on the side of the cerebral lesion. Two patients received one such block, four received multiple blocks at intervals of two to four hours, and two received continuous block. The mortality in the group treated by block was 62.5%, and that of the untreated group was 75%. However, it was our clinical impression that more rapid and satisfactory recovery from paralysis occurred in those treated by block than in those not so treated. It was obvious, nevertheless, that this form of therapy was not satisfactory, and our attention was therefore turned to the possible prevention of the complication.

PREVENTIVE MEASURES

Since most of the emboli were presumed to be related to dislodgment of the thrombotic material in the auricular appendage as the operator's finger was inserted into the left auricle, an attempt was first made to recognize thrombosis of the appendage before insertion of the finger. Then we thought it possible, after carefully clamping the appendageal base, to remove the thrombus from the excluded appendageal lumen. By intermittently releasing the basal clamp, we would provide a rapid gush of blood to expel any residual bits of loosened material. This technique has at times seemed to be highly effective. However, it is open to the objection that the clot may initially extend well into the auricular cavity and may, therefore, be divided by the pressure of the basal clamp. Also, some thrombi are completely or partially organized and well attached, so that they are not easily or completely extractable from the appendage or auricle. Having observed cerebral embolism develop in two patients when thrombi had apparently been completely removed from the appendage, we reluctantly abandoned this technique. We now feel that it is often impossible to recognize thrombosis in the auricular appendage before opening the structure.

Our next attempt was to devise an entrance into the left auricle that would avoid the thrombosed appendage. Such possible sites of entrance are provided by an incision in the auricular wall itself or by an incision in the wall of the left superior pulmonary vein. Entrance through the auricular wall, even though guarded by a purse-string suture about the area, carries the inherent risk of uncontrollable hemorrhage. The sometimes friable auricular wall may be easily lacerated by a too tight purse-string or mattress suture. Therefore, we have used this approach on only three occasions, fortunately without serious incident.

Entrance into the left auricle by way of the left superior pulmonary vein has been used on 21 occasions. There have been two deaths in this series, both of which could be considered as due to the choice of this method of entering the heart. This represents a mortality of 9.5%. While all 21 patients presented gross thrombosis of the auricular appendage and presumably would have had a high incidence of cerebral embolization, it is questionable whether we can justify entrance via the vein on

3. Bolton, H.; Massey, F., and Maniglio, R.: To be published.
4. Harvey, J., and Rasmussen, T.: Occlusion of the Middle Cerebral Artery, A. M. A. Arch. Neurol. & Psychiat. **66**: 20-29 (July) 1951.
5. Volpitto, P. P., and Risteen, W. A.: The Use of Stellate Ganglion Block in Cerebral Vascular Occlusions, Anesthesiology **4**: 403-408 (July) 1943.
6. Ochsner, A., and DeBakey, M.: Thrombophlebitis: Role of Vasospasm in Production of Clinical Manifestations, J. A. M. A. **114**: 117-123 (Jan. 13) 1940.
7. Volpitto, P. P., and Risteen, W. A.: Stellate Ganglion Block: A Definite Anterolateral Approach, Anesthesiology **5**: 491-494 (Sept.) 1944.
8. Tuohy, E. B.: Continuous Spinal Anesthesia: A New Method Utilizing a Urethral Catheter, Surg. Clin. North America **25**: 834-840 (Aug.) 1945.

the basis of these statistics. However, both deaths occurred relatively early in our use of vein approaches, and it is noteworthy that there were no instances of brain embolism in this series, in which there was undoubted predisposition to embolism.

The disadvantages of the auricular approach via the left superior pulmonary vein may be summarized as follows.

1. The finger is 2 to 4 cm. farther from the mitral valve than when entrance is effected through the auricle. This makes both the digital pressure technique and instrumental division of the valve technically more difficult and more likely to be imperfectly performed.

2. The vein is often insufficiently large to admit the average operator's finger, requiring extension of the vein incision partially into the auricular wall. Otherwise the vein may be torn partially away from the auricle, resulting in serious hemorrhage and great difficulty in restoration of the vascular continuity.

3. Hemorrhage about the finger, or about the finger and instrument, and after removal of the finger from the heart, may be difficult to control. It may be managed by the use of a purse-string suture in the auricular wall or by a curved Potts-type clamp applied to the side of the auricle, or by both. The former puckers the auricle so much that it makes reparative suturing difficult. The clamp may lacerate the usually somewhat friable auricular wall. At times bleeding may be controlled by manually pinching the vein.

4. Thrombosis of the pulmonary vein beginning at the suture line may lead to hepatization of the upper lobe of the left lung and to death from what clinically appears to be pulmonary edema. This occurred only once in our series, when the pulmonary vein was incised transversely. The lumen of the vein was markedly diminished by the constricting effect of the sutures. Since using a longitudinal incision, we have had no more difficulty of this type.

5. Temporary obstruction of the blood return from the upper lobe (or from the entire left lung when only a single left pulmonary vein exists) may precipitate cardiac standstill in a borderline case. The difficulties of performing cardiac massage and resuscitation are greatly increased when there is a clamp on the side of the auricle.

In spite of these objections, we have continued to use this means of approach to the left auricular lumen and expect to continue to do so in certain cases. An example would be the case in which thrombosis and organization have taken place in the distant past, resulting in extreme contracture and near obliteration of the appendage. It is impossible to insert the index finger through such a diminutive structure. It is possible, at least theoretically, to avoid embolism of thrombotic origin to all locations, both cerebral and peripheral, by entrance through a pulmonary vein.

When it is deemed necessary to utilize the pulmonary vein to enter the left auricle, the left pulmonary drainage is inspected. Sometimes a single large vein drains the entire left lung. Technically such a single large vein affords an ideal entrance into the heart, but it also requires cutting off the entire blood return from the left lung during the period of clamping. Usually the pulmonary veins enter the auricle separately, and its accessibility commends the superior one for our use.

TECHNIQUE OF COMMISSUROTOMY VIA LEFT SUPERIOR PULMONARY VEIN

The chosen vein is carefully mobilized within the pericardium. A purse-string suture of no. 2 braided silk on an atraumatic curved needle is placed in the auricular wall about the base of the vein. It is wise to have the extremities of the purse-string emerge from the auricular wall at its most accessible aspect (laterally) and at about 1 cm. from the vein insertion. This permits one to extend the vein incision for a distance into the true auricular wall if the vein lumen is insufficient to permit complete insertion of the operator's index finger. The purse-string is now passed through a Rumel-Belmont tourniquet to permit flexible, reliable hemostatic control.

A Potts' ductus clamp, preferably of the angulated variety, is now applied across the distal extremity of the vein. A half-curved Potts' clamp is placed on the auricular wall proximal to the vein. A 2 cm. incision is made longitudinally in the most accessible wall of the vessel, extending, if necessary, for a distance into the auricular wall. A bistoury type of knife blade and a pair of angulated iris scissors are ideal for opening the vein.

The two lips of the vein incision are picked up with fine thumb forceps, and the tip of the operator's double-gloved right index finger is engaged in the opening. As the proximal clamp is released, the finger is quickly inserted into the left auricle and the purse-string is tightened sufficiently to control bleeding.

The auricle and especially the internal opening of the appendage are explored for thrombi. If any are felt, they are carefully avoided. In three instances we have felt eel-like streamers of evidently very friable thrombi protruding from the appendage into the auricular lumen. In four cases there was extensive intra-auricular thrombosis, with a large portion of the chamber filled by incompletely adherent soft clots. In one case an attempt to remove the thrombi proved fatal (from hemorrhage). In the other three, they were ignored; they produced no subsequent symptoms.

The valve is explored and commissurotomy is performed by digital pressure alone whenever possible. The digital method was used alone in 10 cases of our series. The remaining 11 valves required instrumental division. When an instrument is employed, great technical difficulties may be encountered and bleeding is likely to be serious, because the necessary mechanical maneuvers often distort the vein orifice, owing to the disadvantageous site of entrance and the increased distance from the valve.

When the definitive work is completed, the finger is withdrawn from the heart and vein and the auricle is reclamped for hemostasis. The vein is flushed with dilute heparin solution, and the lips of the incision are approximated by a continuous suture of 5-0 arterial silk on a curved needle. We usually run it as an everting mattress suture from one extremity of the incision to the other and then reverse the suture, using a more superficial run-

ning stitch to approximate the adventitia. The terminal end of the suture can then be conveniently tied to the original end. If the vascular incision has invaded the auricular wall, it is well to place a single mattress suture of heavier material at this point.

After release of the clamps, pulmonary vein flow is resumed. There should be minimal bleeding. The purse-string suture may be tightened at any time if the clamp fails to provide adequate hemostasis. This suture should be removed or at least divided after vascular continuity has been restored.

After a sizable experience with the technical and potential difficulties and dangers associated with the approach to the valve via the superior pulmonary vein, we became satisfied that it did not provide a completely satisfactory answer to the problem of cerebral embolization during commissurotomy. Part of this dissatisfaction stemmed from a realization that emboli might originate from calcium deposition on the valve itself. Another unsatisfactory feature was the difficulty noted in recognizing minor degrees of thrombosis in the auricular appendage until after it had been actually clamped and opened. We felt that there was appreciable danger of the damage having already occurred by the time this stage of the operation had been reached. Slight to extensive thrombosis of the appendage had occurred in 35.5% of 200 cases of commissurotomy reported elsewhere.[9] In only about half of these was the condition recognized prior to opening of the appendageal lumen.

It appeared that it would be impossible, at least on many occasions, to prevent the entrance of free particulate matter into the systemic circulation during the course of a commissurotomy. There would thus always be danger that these particules might enter the carotid arteries and produce cerebral embolization. The only satisfactory answer seemed to lie in the direction of "straining" the blood entering these vessels or of obstructing them during the strategic periods when the particles might enter the aorta. "Straining" the blood seemed impractical, so that attempts were made to occlude the vessels.

It occurred to us that, by simply squeezing the patient's neck very tightly for periods up to 60 seconds at the strategic moments (such as during clamping of the appendage, inserting the finger into the heart, and dividing the calcified valve), we might greatly slow the flow of blood through the carotid arteries. Then the possible emboli would undoubtedly pass by the mouths of these vessels and produce their effects, if any, in the upper extremities or in the lower portions of the body. This hope proved to be vain. There were two cerebral emboli in nine patients subjected to such external cervical pressure. In addition, another patient seemed in danger of cardiac standstill, presumably as a result of the attendant carotid sinus reflex simultaneously produced.

Finally, it was deemed necessary to actually mobilize the root of the innominate and left common carotid arteries in the mediastinum to permit transient occlusion of their circulation. On the counsel of one of us (A. K. O.) and in view of the experiences of Hamby,[10] it was deemed reasonable to completely prevent blood flow through the innominate artery for a period of up to 20 minutes, during which time the definitive valvular operation should certainly have been accomplished. Such innominate occlusion would seem surely to prevent any possibility of embolization to the right side of the brain (the site of embolism in five, or 41.6%, of our series).

Courville [11] has shown that the brain can tolerate oxygen want, and Stokes and Gibbon [12] have shown that it can tolerate complete cessation of circulation for periods of up to three minutes. It was, therefore, deemed safe simultaneously to occlude temporarily the left common carotid artery at its origin for periods of up to 60 seconds. This could be done at each strategic period of manipulation, with reliance on the cardiac contractions to evacuate all free particulate matter from the heart and the aortic arch within 20 to 60 seconds of dislodgment. This would afford a considerable degree of protection to the left side of the brain.

We found we could easily accomplish this intermittent obstruction to the left common carotid artery by kinking it with an umbilical tape applied around it near its origin. It takes little traction to kink the left common carotid in the average person. It was felt best to leave the left subclavian artery unoccluded. It provides a certain amount of the cerebral circulation by way of the left vertebral artery and, therefore, would tend to prevent the more serious features of cerebral anoxemia from appearing. Should a small embolus enter the left vertebral artery, it would seem unlikely to appreciably interfere with the cerebral circulation, since there is extensive collateral circulation at the termination of this vessel and of the basilar artery (fig. 3).

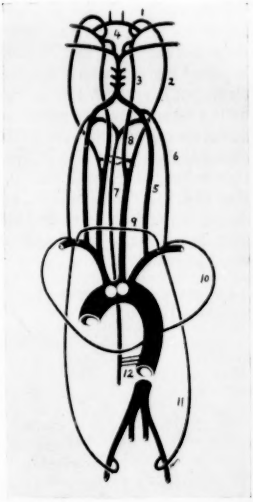

Fig. 3.—Possible collateral arterial pathways to the brain: (1) ophthalmic and supraorbital, (2) external carotid, (3) internal carotid, (4) circle of Willis, (5) vertebral, (6) ascending cervical, (7) anterior spinal, (8) superior thyroid, (9) inferior thyroid, (10) highest intercostal, (11) internal mammary, and (12) segmental.

9. Bailey, C. P., and Redondo, H.: To be published.

10. Hamby, W. B.: A Method for Control of Carotid Cerebral Circulation During Operation, J. Neurosurg. **2**: 241-244 (May) 1945.

11. Courville, C. B.: Untoward Effects of Nitrous Oxide Anesthesia, with Particular Reference to Residual Neurologic and Psychiatric Manifestations, Mountain View, Calif., Pacific Press Publishing Association, 1939.

12. Stokes, T. L., and Gibbon, J. H., Jr.: Experimental Maintenance of Life by a Mechanical Heart and Lung During Occlusion of the Venae Cavae Followed by Survival, Surg., Gynec. & Obst. **91**: 138-156 (Aug.) 1950.

TECHNIQUE OF PROTECTIVE CAROTID OBSTRUCTION

The technique we have worked out to apply this principle is as follows: A left lateral approach is used as usual. The fourth rather than the fifth intercostal space is chosen for entrance into the thorax, because it affords greater accessibility to the upper mediastinum. The lung is compressed downward, and the mediastinal pleura is opened longitudinally above the aortic arch between the left vagus and the left phrenic nerves. By blunt dissection, the left common carotid artery is mobilized at its origin. An umbilical tape is passed underneath it, and tentative traction is made so that the operator can determine the ease of kinking off its lumen (fig. 4).

In most instances the innominate artery is found to be more deeply located within the mediastinal tissues and to lie just anterior to the left common carotid. Occasionally it lies far enough anteriorly to require mediastinal dissection anterior to the left phrenic nerve. A silk suture is placed under it with a ligature carrier or gallbladder clamp but is not tied. Further mobilization and traction on this suture permits a noncrushing clamp to be placed across the origin of the vessel. We prefer to use a bulldog clamp of the Beck or Potts' type. Disappearance of the right radial and temporal pulse indicates complete occlusion (fig. 5). The innominate artery is kept obstructed during the entire period of definitive intracardiac surgery. This is usually less than 20 minutes but in one case was 34 minutes.

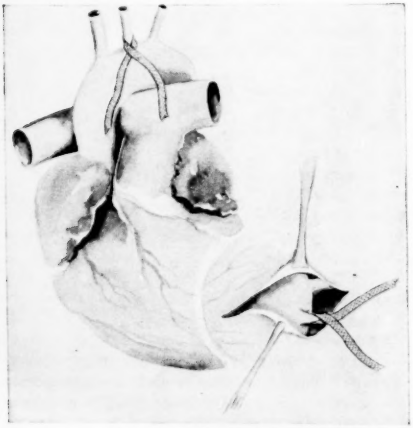

Fig. 4.—Umbilical tape about origin of the left common carotid artery for intermittent traction occlusion of blood flow at the strategic periods of the operation. Kinking of the vessel is carried out for periods of 30 to 60 seconds whenever it is felt likely that free particulate matter may be released into the blood stream.

The upper pericardium is then opened just posterior to and parallel with the left phrenic nerve. A purse-string suture of heavy braided silk is placed in the epicardium about the base of the appendage and is connected with a Rumel-Belmont tourniquet. If the appendage requires much mobilization or manipulation, the tape about the left common carotid may be drawn on for 30 to 60 seconds to permit safe evacuation of any inadvertently dislodged clots.

As a Satinsky clamp is applied across the base of the appendage, traction is again made on the carotid artery. The appendage is then opened and inspected for clots.

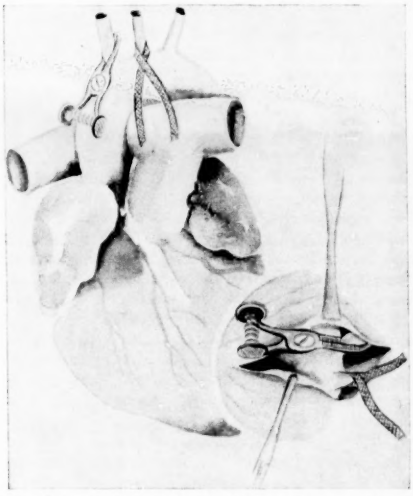

Fig. 5.—Bulldog clamp placed across the origin of the innominate artery to block its flow during the entire period of definitive intracardiac surgery. This should afford complete protection from embolization to the right side of the brain.

They may be surgically evacuated if present. Then the operator's finger is inserted into the heart, and simultaneously traction is again made on the carotid for 30 to 60 seconds. Such carotid traction is repeated whenever the valve is examined or manipulated, if it is felt that any loosely attached calcium, vegetations, or clots are present. When a calcified valve is divided by either digital or instrumental means, traction is again made. Finally, as the finger leaves the heart and the appendage is tied the vessel is again occluded for a period estimated to be long enough to clear completely the heart and aortic arch of any loose particulate material. After the appendage is closed, the bulldog clamp is removed from the innominate artery and the suture and umbilical tape are cut and extracted. The operation is then terminated in the usual way, without any suturing of the mediastinum.

COMMENT

So far we have employed this type of partial obstruction to the cerebral blood flow in 80 patients undergoing mitral commissurotomy. In 26 of them, the appendage was grossly thrombosed. There have been no instances of cerebral embolization in this series. Neither have there been any symptoms suggestive of cerebral ischemia. There have been no recognized peripheral emboli. The longest period of obstruction of the left common carotid in this series was two minutes. The only recognizable

untoward occurrence in this series of patients was development of a left recurrent laryngeal nerve paralysis in two patients.

SUMMARY AND CONCLUSIONS

Cerebral embolization as a result of the manipulations incident to mitral commissurotomy may be lethal or may permanently incapacitate the patient. This complication occurred in 5.1% of 235 cases in which methods other than carotid obstruction were employed to protect the brain.

Stellate ganglion block, in addition to other medical measures, was found to be of relatively small benefit in the treatment of 12 patients with cerebral embolization incident to commissurotomy. Prevention of the occurrence of cerebral (and peripheral) embolization of thrombotic origin during commissurotomy is theoretically and perhaps practically possible by utilization of the left superior pulmonary vein as a site of entrance into the left auricle. However, in 21 cases with obvious thrombosis of the appendage in which this technique was employed, there were two deaths, directly related to the vein approach. Because of the added technical difficulties and inherent potential dangers, this procedure is not recommended as a routine prophylactic method, although it will continue to be useful in certain cases of auricular thrombosis.

Prevention of complications by occlusion of the innominate and left common carotid arteries as described was attempted in 80 cases, with no evidence of cerebral or peripheral emboli and no evident untoward by-effects. Although the series is small, the results, to date, suggest that this technique may afford a reasonably easy, safe, and effective method for the prevention of cerebral embolization during commissurotomy for mitral stenosis and during other operations performed within the chambers of the left heart. Perhaps it should, in the future, be routinely used in all patients subjected to commissurotomy. Results suggest that there may be effective available collateral arterial supplies to the brain, which will support its life for periods somewhat longer than required by this technique.

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LOSS OF SENSE OF TASTE DUE TO METHYLTHIOURACIL THERAPY

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The thiouracil group of antithyroid drugs has received an extensive clinical trial in the past eight years, and their toxic effects have been amply documented. Loss of the sense of taste has been mentioned in only a single report.[1] One of the 16 patients treated with methylthiouracil by Leys complained of complete loss of taste while receiving a daily dose of 1.4 gm. Taste sensation gradually returned when the dose was reduced.

We have recently observed complete loss of the sense of taste in two patients receiving methylthiouracil. Because of the rarity of this toxic effect and its benign nature, a brief report is appended.

REPORT OF CASES

CASE 1.—A 48-year-old woman was referred by an ophthalmologist because of marked lid retraction without measurable proptosis of the eyes and persistent periorbital edema. Her history was long and complex and only those portions pertinent to the present discussion will be included. The thyroid gland was diffusely enlarged to about three times normal size. It was smooth though lobulated, firm, and easily outlined and exhibited no bruit. The pulse rate was 100 per minute and blood pressure 146/80 to 175/88. The thyroid uptake of radioactive iodine 24 hours after the oral administration of 50 μc of I^{131} was 43%. The serum protein-bound iodine was 7.4 μg per 100 cc. The basal metabolic rate was +6% and the serum cholesterol 178 mg. per 100 cc. Because of certain equivocal thyrotoxic stigmas and the high normal I^{131} uptake and protein-bound iodine level of the serum, a therapeutic trial of strong iodine (Lugol's) solution was instituted. Sufficient clinical improvement ensued to warrant extending the therapeutic trial with the administration of methylthiouracil, 600 mg. daily in divided doses. After 20 days of therapy, the patient reported the gradual loss of taste sensation. Within 10 more days gustatory sense was completely absent. She found food "flat" in taste and was unable to distinguish sweet, sour, salty, peppery, or bitter substances. Three weeks later she noted that the acuity of her sense of smell was somewhat dulled. She was unable to smell an onion, and customary lacrimation did not occur. Familiar odors could hardly be detected and could rarely be identified accurately. Otherwise she was clinically improved, exhibiting a weight gain of 5 lb. (2.3 kg.), reduction of pulse rate to 85 and blood pressure to 130/80, disappearance of lid lag, reduction of lid retraction, and absence of periorbital edema. There were no signs of hypothyroidism or myxedema. Cranial nerve motor and sensory function, aside from taste and smell, were intact. There was no evidence of facial palsy; the gag and corneal reflexes were normal; and phonation was unimpaired. The tongue appeared normal, showed normal motor activity, and was sensitive to touch, pain, and temperature changes. The buccal mucosa was normal. The parotid and submaxillary salivary glands and ducts revealed no abnormalities. Because the patient could no longer tolerate loss of gustatory and olfactory sensation, 5-iodo-2-thiouracil (itrumil,® Ciba Pharmaceutical Products, Inc.), 400 mg. per day, was substituted for methylthiouracil. She reported that three days after this change in medication severe pain in the thyroid region developed; the gland became more enlarged, hard, and painful; and her temperature rose to 104 F orally. Because of my absence, another physician was consulted, who made a diagnosis of acute thyroiditis. Aureomycin therapy effected a relatively rapid subsidence of the acute process. Two weeks later I examined the patient. The thyroid borders were prominent, and the gland was larger and firmer than on previous examinations. At this time, three weeks after cessation of methylthiouracil therapy, the patient was able to recognize only the taste of salt. During the ensuing two weeks, her sense of taste and smell gradually improved but was not completely normal. Food still tasted "flat," and sweet substances seemed intolerably saccharine. Six weeks after treatment with methylthiouracil was stopped, taste and smell were completely normal. The patient refused to retest the effect of methylthiouracil and continued taking iodothiouracil, with maintenance of clinical improvement and without toxic effects. The thyroid gland had returned to its original size and consistency prior to the episode when thyroiditis was diagnosed.

CASE 2.—A 39-year-old woman complained of weight loss of 22 lb. (10 kg.) in one year despite a good appetite and her usual diet, hyperhidrosis, heat intolerance, palpitation, and

1. Leys, D.: Hyperthyroidism Treated with Methyl Thiouracil, Lancet **1**: 461-464 (April 14) 1945.

nervousness. During the previous year her eyes appeared prominent and staring. Examination revealed a nervous hyperkinetic Negro woman with a pulse and cardiac rate of 104 per minute, blood pressure 132/80, mild exophthalmos, slight lid lag, warm dry skin, fine digital tremor, warm moist hands, and a diffusely enlarged thyroid gland. The basal metabolic rate was +50%, serum cholesterol was 123 mg. per 100 cc., and thyroid uptake of radioactive iodine 24 hours after the oral administration of 50 μc of I^{131} was 53%. A diagnosis of diffuse toxic goiter (Grave's disease) was made, and treatment with 600 mg. of methylthiouracil per day in divided doses was instituted. Unequivocal improvement, a decrease in the basal metabolic rate, and a rise in cholesterol to normal levels confirmed the diagnosis. Four and a half weeks after commencing antithyroid therapy, the patient stated that she had lost her sense of taste to everything except sweet substances and that these imparted an unpleasant bitterness. There were no other complaints and no abnormal physical findings. There was no evidence of hypothyroidism or myxedema. The tongue, buccal mucosa, submaxillary and parotid salivary glands, and their ducts revealed no gross pathological changes. Cranial nerve function was otherwise normal. Two weeks later she complained of mild dysphagia and slight soreness of the tongue unaccompanied by physical evidence of glossitis. Complete loss of taste sensation ensued, but there was no impairment of olfactory sense. Methylthiouracil therapy was omitted, and subtotal thyroidectomy was carried out without complications. One month after surgery the patient was euthyroid and in excellent condition. Taste had almost completely returned except for her inability to recognize sweet substances. Two months after thyroidectomy the basal metabolic rate was -13%, cholesterol was 344 mg. per 100 cc., and symptoms and signs of hypothyroidism were evident. Taste sensation had completely returned to normal. Thyroid, 30 mg. daily, was administered together with a test dose of methylthiouracil, 50 mg. daily. The latter was gradually increased to 150 mg. daily; this dose was maintained for six weeks without affecting taste sensation. There did not seem to be sufficient justification to warrant the administration of a potentially toxic drug in larger doses to this patient experimentally, and the methylthiouracil therapy was stopped.

COMMENT

Loss of taste and partial loss of olfactory sense represent neurotoxic reactions to methylthiouracil therapy. Disturbances of the nervous system during antithyroid therapy are unusual but have been reported. Gibson and Quinlan [2] described periarteritis and perivascular cuffs of inflammatory cells in a patient who died after receiving 31.5 gm. of thiouracil. Her early complaints included joint pain and numbness of the extremities, loss of ankle jerks, and loss of vibratory sense. Curtis and Swenson,[3] in their review of thiouracil therapy of hyperthyroidism, listed loss of ankle jerks and vibratory sense, nausea, vomiting, various psychoses, and confusional states as reactions. One of McCullagh, Hibbs, and Schneider's [4] patients, while receiving propylthiouracil, complained of numbness of the extremities. Williams and co-workers [5] listed five patients who exhibited neuritis during thiouracil treatment. Frawley and Koepf [6] reviewed the literature concerning neurotoxic reactions to thiourea derivatives and described a 64-year-old woman who, while receiving propylthiouracil, had burning of the throat, palate, tongue, and lips and perioral tingling and numbness of the tongue and lips. Taste sensation was not involved. These sensory disturbances disappeared when treatment with the drug was omitted and reappeared when propylthiouracil was again administered. Their review included reports of vertigo, paresthesias, loss of taste (Leys' case), and paresis of various muscle groups during methylthiouracil therapy.

Neuropathic disturbances do not commonly accompany hyperthyroidism despite the augmented thiamine and vitamin B requirements that hyperthyroidism creates. Frawley and Koepf [6] postulated that the thiamine depletion of thyrotoxicosis may render the nervous system more susceptible to the neurotoxic effects of thiourea derivatives. Loss of taste or olfactory sensation has not been reported in cases of experimental thiamine malnutrition.[7] They also discussed the possible role of peroxidase in nerve function and indicated that the antiperoxidase action of thiourea compounds may account for their neurotoxic action.

Hypothyroidism induced by methylthiouracil therapy could conceivably contribute to the loss of gustatory and olfactory sensation. Histological changes in the nervous system have been described in patients with myxedema. Myxedematous patients exhibit a general loss of sensory acuity and may complain of paresthesias, vertigo, and deafness. Loss of taste sensation has not been reported in patients with myxedema, although Means [8] listed atrophy of the tongue in 12% of his cases. My patient, M. B., during the period of her inability to taste, complained of fatigue, somnolence, and intolerance to cold. Her cholesterol level had risen to 457 mg. per 100 cc., and she was undoubtedly hypothyroid at that time. After subtotal thyroidectomy, however, when she again became hypothyroid, taste sensation remained normal despite the ingestion of 150 mg. of methylthiouracil daily for six weeks. Patient M. A. never became hypothyroid during the period of loss of taste and smell.

Loss of the sense of taste with or without interference with olfactory function, though toxic reactions to methylthiouracil therapy, are apparently benign and unaccompanied by other more serious untoward effects. Treatment with the drug, as far as I can judge at this time, need only be stopped when the patient can no longer tolerate the insipidity of food and drink. In my patients taste sensation became completely normal in six and eight weeks, respectively, after omitting treatment with the drug. Reduction in dose was effective in Leys' case [1] and is probably the first logical step to take if this toxic symptom appears. The possible therapeutic efficacy of thiamine hydrochloride given in large doses may be considered.

The development of acute thyroiditis in one of my patients during antithyroid therapy represents a most unusual coincidental catastrophe. Though I did not examine the patient until two weeks after the episode, the history and residual findings on palpation of the gland tended to

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8. Means, J. H.: The Thyroid and Its Diseases, ed. 2, Philadelphia, J. B. Lippincott Company, 1948, p. 233.

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confirm this diagnosis. A careful search of the literature has not revealed a single report of thyroiditis incident to the administration of a thiourea derivative. Thiouracil has been frequently used in the treatment of acute thyroiditis. Fahlund [9] reported painful enlargement of the thyroid gland as a manifestation of sensitivity to thiocyanate. My patient, after the acute episode, has tolerated eight months of treatment with iodothiouracil without incident. It is, of course, possible that the appearance of acute thyroiditis was merely a coincidental occurrence, unrelated to the use of methylthiouracil or iodothiouracil.

SUMMARY

Two cases of thyrotoxicosis are reported in which complete loss of the sense of taste occurred during the administration of methylthiouracil. In one of the cases partial loss of olfactory sense also developed. Complete restitution of normal gustatory and olfactory sensation followed omission of treatment with the drug.

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9. Fahlund, G. T. R.: Painful Enlargement of the Thyroid Gland, a Manifestation of Sensitivity To Thiocyanate, Proc. Staff Meet., Mayo Clin. **17**: 289-293 (May 13) 1942.

ADRENAL FUNCTION IN WOMEN WITH CHRONIC EPILEPSY

URINARY STEROID EXCRETION AND EOSINOPHIL LEVELS BEFORE AND AFTER CONVULSIVE SEIZURES

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There are no data in the literature on the excretion patterns of urinary steroids in patients with grand mal epilepsy. There are, however, limited reports on the effect of electric convulsive therapy on the excretion patterns in patients with mental disorders. Hemphill [1] examined the effect of electric convulsive therapy on the rates of 17-ketosteroid excretion in 18 patients and reported that 9 showed a significant increase but that the remainder showed no change in their rate of excretion. Ashby [2] noted no change in 17-ketosteroid excretion in similar studies; he did find that "the usual effect of convulsive therapy is to cause a brisk outpouring of adrenal corticosteroids during the first few days of treatment." He further stated that "after this outpouring the activity returns to its previous level even though treatment continues." There are some reports on eosinophil levels made before and after grand mal seizures.[3]

From time to time the adrenals have been implicated in convulsive seizures. An altered adrenal steroid excretion pattern in canine epilepsy (agene-induced) has been reported.[4] At the same time it was noted that the administration of exogenous compound E or corticotropin (ACTH) leads to a greater duration and intensity of seizures in canine epilepsy.[5]

It is the purpose of this paper to present some preliminary data on various indexes of adrenal cortical activity, prior to and following grand mal seizures in human epileptics. It is further desired to determine the effect of grand mal seizures on adrenal cortical activity and, in turn, to note the effect of adrenal cortical activity on these seizures.

PLAN OF STUDY, METHODS, AND MATERIALS

The group for study consisted of six women whose ages ranged from 26 to 56 and who were patients at the Connecticut State Hospital in Middletown, Conn. Most of them had been experiencing grand mal seizures since puberty. During the course of this experiment all patients continued to receive their daily medication of diphenylhydantoin (dilantin®) sodium and phenobarbital sodium.

The indexes of adrenal cortical activity chosen for study were urinary 17-ketosteroid and reducing corticoid excretion and eosinophil counts. The control values consisted of three to four determinations of 17-ketosteroid, corticoid, and eosinophil levels, which were obtained over a period of a week when all patients were considered to be seizure-free. The postseizure values were obtained after the first grand mal seizure as it occurred in the individual patient. As soon as the patient experienced a grand mal seizure (after the control period), 24-hour urine samples were collected for periods of two to four days; these samples were analyzed for 17-ketosteroid and reducing steroid content. The first eosinophil counts were made two to four hours after the actual convulsion, and a count was made on two or three consecutive days.

The 17-ketosteroid content of the urine was estimated by application of the Zimmerman reaction to the total neutral steroid fraction. The actual colorimetric determination was carried out according to the technique of Holtorff and Koch [6] with two modifications [7]: the digestion time was increased to 105 minutes, and 60% (rather than 95%) ethyl alcohol was used for the dilution of the reaction mixture.

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This study was made possible by the cooperation of Drs. E. C. Yerbury, C. Russman, M. Lindsay, and C. Beauchemin of the Connecticut State Hospital, Middletown, Conn.

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2. Ashby, W. R.: The Effect of Convulsive Therapy on the Excretion of Cortins and Ketosteroids, J. Ment. Sc. **95**: 275, 1949.

3. Rud, F.: The Eosinophil Count in Health and Mental Disease: Biometrical Study, Acta psychiat. et neurol., supp. 40, pp. 1-443, 1947.

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7. Engstrom, W. W., and Mason, H. L.: A Study of the Colorimetric Assay of Urinary 17-Ketosteroids, Endocrinology **33**: 229, 1943.

The corticoid content of the urine was estimated according to the method of Heard, Sobel, and Venning,[8] which is based on the knowledge that most of the adrenal steroids have strong reducing sugar-like properties, which are imparted by the presence in the side-chain of the primary alpha ketol grouping, characteristic of fructose. All of the active hormones of the adrenal cortex have this reducing property.

Eosinophil counts were done by the method of Randolph [9] modified to stain only eosinophils. Counts were made in 0.2 mm. depth Levy counting chambers with improved Neubauer rulings. Pipettes were tested by the United States Bureau of Standards.

17-Ketosteroid, Reducing Corticoid, and Eosinophil Levels in Six Epileptic Patients *

Patient	E. B.	J. H.†	L. M.	J. R.	R. S.	M. S.	Mean
	17-Ketosteroids, Mg./24 Hr.						
Preseizure values	7.3	5.7	8.0	5.2	6.3	4.6	...
	5.7	6.2	6.4	9.0	9.6	6.3	...
	7.4	6.6	6.8	4.6	6.1	7.4	...
	...	7.7	...	2.5	9.4	6.8	...
	...	8.2	...	6.6	3.7	6.0	...
Mean	6.8	6.9	7.1	5.6	7.0	6.2	6.6
Postseizure values	9.8	...	6.7	8.9	4.4	8.6	...
	5.3	...	2.7	8.6	7.3	7.0	...
	2.3	...	5.8	4.4	5.8	5.9	...
	...	...	10.1	...	5.6	7.9	...
Mean	5.9	...	6.3	7.3	5.8	7.4	6.5
	Reducing Corticoids, Mg./24 Hr.						
Preseizure values	1.63	2.63	2.15	1.73	3.07	2.04	....
	1.47	1.08	1.32	1.19	1.48	1.53	....
	....	1.43	....	0.78	2.41	1.58	....
Mean	1.55	1.71	1.83	1.23	2.32	1.65	1.71
Postseizure values	1.74	....	2.28	1.51	0.31	1.41	....
	1.01	....	1.60	1.64	1.26	2.17	....
	....	....	....	....	1.05	....	....
Mean	1.38	....	1.94	1.57	0.87	1.79	1.51
	Eosinophils/Cu. Mm.						
Preseizure values	325	200	200	150	150	212	...
	257	211	175	148	166	306	...
	200	200	201	140	168	200	...
	307	229	234	147	159	303	...
Mean	286	210	202	146	161	255	210
Postseizure values	125	...	193	156	193	106	...
	88	...	266	244	150	86	...
	81	...	...	259	...	70	...
	79	...	...	...	...	68	...
Mean	92	...	199	216	170	82	127

* Analysis of variance:
17-ketosteroids: F = 1.07, not significant.
Corticoids: F = 1.22, not significant.
Eosinophils: F = 11.95, P = 0.01-0.001, significant.
† J. H. was not available for analysis of postseizure phase.

Data for the six patients are as follows:

R. S. was 52 years old. Her first grand mal attack occurred at the age of 16 and was set off by traumatic experience. The electroencephalogram showed a very abnormal right frontal area.

L. M. was 37 years old. Her first grand mal attack occurred at the age of 3, followed by convulsions for three years. Grand mal seizures started again at the age of 18. The electroencephalogram showed a very abnormal right frontal area.

J. H. was 56 years old. Her first grand mal attack occurred at the age of 20. The electroencephalographic tracings for both frontal areas were diffusely irregular.

M. S. was 30 years old. Her first grand mal seizure occurred at the age of 16. Electroencephalographic tracings were diffusely irregular.

E. B. was 34 years old. She had had grand mal attacks since the age of 12. Electroencephalographic tracings were diffusely irregular.

J. R. was 26 years old. Her first grand mal convulsion occurred at the age of 15. Electroencephalographic tracings for both frontal lobes were very irregular.

RESULTS

From the data in the accompanying table, it will be seen that the mean control excretion values for 17-ketosteroids are somewhat less than those reported in the literature for normal women in this age range.[10] It has been reported that 17-ketosteroids show a progressive decline with age.[11] Talbot and Butler [12] have estimated that a single determination of 17-ketosteroids on a 24-hour basis would give a value within 15% of the mean value obtained by repeated estimations. The variation from the mean values in this series is certainly greater than 15%. It should also be noted that there is no significant difference in the mean values of 17-ketosteroids excreted during the postseizure period in comparison with the control period (6.6 mg. per 24 hours before and 6.5 mg. per 24 hours after seizures).

A slight decrease in the excretion of reducing corticoids after seizures was observed. However, when subjected to an analysis of variance, this decrease was not statistically significant when compared with seizure-free values.

The effect of grand mal seizures on eosinophil levels is also shown in the table. It will be seen that there is a decrease in eosinophils following seizures in some cases. An analysis of variance indicated that this decrease was statistically significant. According to Rud,[3] the majority of authors agree that there is a general eosinopenia following convulsive attacks in epileptics.

COMMENT

The early work implicating the adrenal in convulsive states indicated that excessive secretion of the adrenals could, on occasion, precipitate seizures. Fischer and Fischer [13] in 1914 reported that inhalation of amyl nitrite produced convulsions in rabbits. They postulated that the capacity for convulsive reactivity in rabbits decreased with a decrease of adrenal substance. They also stated that one could increase convulsive susceptibility experimentally by causing a hyperfunction of the adrenal glands. Their work, although controversial, led to the examination of unilateral and subtotal adrenalectomy as a possible alleviating measure in cases of severe chronic grand mal epilepsy. The clinical results were equivocal.

The patients in this series exhibited an excretion pattern of 17-ketosteroids that was lower in quantity than comparable "normal" mean values for women in the same age group. The trend here would indicate that female patients with chronic epilepsy show a great deal more day to day variation in 17-ketosteroid excretion than do normal female subjects.

The failure to observe statistically significant changes in 17-ketosteroid and corticoid excretion patterns after

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11. Hamburger, C.: Normal Urinary Excretion of Neutral 17-ketosteroids with Specific Reference to Age and Sex Variation, Acta Endocrinol. **1**: 19, 1948.

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seizures, as compared with the seizure-free periods, indicates that adrenal cortical activity during the actual convulsive phase was not of sufficient intensity to produce changes great enough to be estimated by these two indexes of adrenal activity. However, the general eosinopenia following seizures does seem to indicate that the adrenal cortex is capable of responding to the stress of convulsive seizures with at least a "mild" activity. It would be expected that a stress such as a grand mal convulsion should be of sufficient intensity to induce changes in adrenal steroid excretion levels. Stresses of much less severity and intensity have been reported to induce changes in adrenal steroid excretion.[14]

The patients reported here had been experiencing seizures of the grand mal type for a number of years. A possible explanation for the failure to observe a urinary steroid response following seizures is that the adrenal cortex in these subjects, after years of being stimulated, may have become "conditioned" to the great number of attacks; therefore, it no longer responded to an "ordinary" stress, such as a convulsive seizure. The adrenal cortex in these patients with chronic epilepsy might simply be functioning at a very low ebb, probably only enough to maintain a slow excretion of corticoids, commensurate with the metabolic status of the subject in question.

It was noted during the course of this work that the incidence and duration of seizures increased during the menses and that patients who were maintained relatively seizure-free with diphenylhydantoin sodium and phenobarbital sodium therapy would occasionally "break through" with seizures during the menses in spite of continued medication. These and other observations suggest that, during periods of additional stress (such as the menses in female subjects), epileptics are more susceptible to convulsive seizures.

SUMMARY AND CONCLUSIONS

Women with chronic epilepsy exhibited a greater day to day variation in urinary steroid excretion than do normal female subjects of comparable age. There was no significant difference in the mean values of 17-ketosteroid and reducing corticoid values during the postseizure periods in comparison with control or seizure-free periods. There was a tendency toward eosinopenia after grand mal seizures. Patients with chronic epilepsy do not respond to convulsive stress in the same manner as nonepileptics. There is some indication that the adrenal cortex of patients with chronic epilepsy may become "conditioned" to convulsive stress.

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RESULTS OF SUBTOTAL GASTRECTOMY FOR GASTRIC AND DUODENAL ULCERS SINCE 1917

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In 1914, when most surgeons considered gastroenterostomy the proper surgical therapy for duodenal ulcers, we devised a method for pyloric closure in this operation, using submucous fascial transplants from the fascia lata. We found that this procedure was much more difficult in an inflamed stomach with a duodenal ulcer than it had been in dogs. In a number of cases the pyloric antrum was torn so badly that, as a means to an end, we did a subtotal gastrectomy. These were our first cases of subtotal gastrectomies, and we noted that the results with this operation were much more satisfactory than they had been with a simple gastroenterostomy.

Advocating subtotal gastrectomy as the operation of choice for duodenal ulcer, we presented six such cases at a meeting of the Chicago Surgical Society in 1915. Many of our colleagues at that time opposed this operation on the principle that radical surgical treatment was not indicated for duodenal ulcer, and we did not again have the courage to do subtotal gastrectomies until 1917. The excellent results, which we have noted over a period of years from our first cases of subtotal gastrectomy, had convinced us that this was the proper operation for duodenal ulcer.

For about two years we did some Billroth 1 and Billroth 2 gastric resections, but in 1919 we began routinely to do posterior mesocolic Polya resections. We are still using this procedure at the present time, since it affords such excellent functional results. During the succeeding years, we made slight changes in technique from time to time, but we returned to our original technique of 1919, which we are following today in minute detail.

There is probably no subject in medicine or surgery that has caused more controversy than therapy for duodenal ulcer. Not only has there been a great deal of dispute between surgeons and internists as to whether a duodenal ulcer should be treated medically or surgically, but there also have been variances among surgeons as to which type of operation should be performed for duodenal ulcer. Even after subtotal gastrectomy has been decided on in preference to gastroenterostomy or a pyloroplasty, there is often disagreement among surgeons as to whether it should be an anterior mesocolic or a posterior mesocolic operation.

This article has been shortened by omission of figures 7 through 18, which will appear in the authors' reprints.

From the Stomach Group and Surgical Services of Michael Reese Hospital, Mount Sinai Hospital, and Franklin Boulevard Hospital.

For the above reasons, we formed a stomach group at Michael Reese Hospital in 1918 composed of surgeons, internists, roentgenologists, pathologists, research fellows, physiologists, and a member of the social service department to study the economic conditions of peptic ulcer patients, before and after medical treatment, as well as before and after operation. Patients were not admitted as medical or surgical cases, and the treatment that was instituted depended on the facts that had been disclosed in careful study by the entire group. At first there were differences of opinion as to the proper disposition of these cases, but as we learned from experience these difficulties disappeared. In recent years, there has been very little question as to whether medical treatment should be continued or surgery should be undertaken.

TABLE 1.—*Summary of Statstics Concerning Subtotal Gastrectomies in Group 1, from 1917 to 1938*

	No. of Cases	Diagnosis or Operation	No. of Cases
Total	950	Duodenal ulcer	717
Male	760	Gastric ulcer	131
Female	190	Gastrojejunal ulcer	102
		Ulcer penetrating to pancreas	796
Age, Yr.		Gastrectomy with cholecystectomy	52
20-29	107	Significant History	
30-39	211		
40-49	324	Previous surgery	302
50-59	205	Previous gastric surgery	160
60-69	91	History of bleeding	316
70-79	12	History of acute perforation	93
Type of Anesthesia		Wangensteen Suction Used	
		From 24 to 48 hours	26
General	682	More than 10 days	10
Spinal	156		
Local	112		

Mortality	No. Died	Percentage
Duodenal ulcer	23	3.2
Gastric ulcer	6	4.5
Gastrojejunal ulcer	4	3.8
Total	33	3.5

TABLE 2.—*Summary of Statistics Concerning Subtotal Gastrectomies in Group 2, from 1938 to 1950*

	No. of Cases	Diagnosis or Operation	No. of Cases
Total	846	Duodenal ulcer	614
Male	630	Gastric ulcer	131
Female	216	Gastrojejunal ulcer	64
		Ulcers penetrating to pancreas	726
Age, Yr.		Gastrectomy with cholecystectomy	36
10-19	6	Gastrectomy with appendectomy	9
20-29	82	Gastrectomy with cholecystectomy and appendectomy	5
30-39	144		
40-49	207	Significant History	
50-59	310		
60-69	135	Previous surgery	305
70-79	12	Previous gastric surgery	99
		History of bleeding	306
Type of Anesthesia		History of acute perforation	91
		Wangensteen Suction Used	
Spinal	792		
General	54	From 24 to 72 hours	573
		From 92 hours to 10 days	52
		More than 10 days	27

Mortality	No. Died	Percentage
Duodenal ulcer	8	1.3
Gastric ulcer	3	1.7
Gastrojejunal ulcer	1	0.15
Total	12	1.4

The statistical tables divide our subtotal gastrectomies into two groups. In the first series, group 1 (table 1), there were 950 subtotal gastrectomies performed between 1917 and 1938 at Michael Reese and Mount Sinai hospitals for duodenal, gastric, and gastrojejunal ulcers. The mortality rate was 3.5%. In the second series, group 2 (table 2), in which 846 cases of gastrectomy were done at Michael Reese, Mount Sinai, and Franklin Boulevard hospitals during the period from 1938 to 1950, the mortality was 1.4%. In group 1 there were 160 patients who had previous gastric surgery, but in group 2 in only 99 cases had previous gastric surgery been done. It is interesting to note that in group 1 there were more patients who gave a history of having been subjected to gastroenterostomy and pyloroplasty previously than in group 2. This fact might serve to explain the smaller incidence of gastrojejunal ulcers in group 2, in which 64 cases were reported, in comparison to the 102 cases of gastrojejunal ulcers in the first series. The number of patients who gave a history of previous bleeding or acute perforation was relatively the same in both groups.

In our 950 cases of posterior mesocolic gastric resection in group 1, we used the Wangensteen intubation method postoperatively in only 26 cases for 24 to 48 hours, and in 10 cases for more than 10 days, when it was clinically indicated for vomiting and regurgitation. However, in our 846 cases in group 2, in which the same surgical procedure was done, we used gastric intubation almost routinely, as we found it an effective method for preventing even this small number of complications. Gastric suction is instituted on the evening before surgery so that the stomach is completely empty and contracted at the time of operation. The vast majority of these patients kept the tube for only 24 to 72 hours, and only in exceptional cases was a longer intubation necessary. We also felt that by keeping the remaining portion of the stomach empty and decompressed, we reduced the amount of edema at the site of the anastomosis. However, since the Polya posterior mesocolic procedure gives such an excellent functional result, it is undoubtedly true that most of these patients would have done well without Wangensteen suction. It has been our habit to use the Levine tube more sparingly in the older age group because of the higher incidence of upper respiratory complications such as pharyngitis and tracheitis following its use.

In the first group of 950 cases, the anesthesia in 682 cases was cyclopropane or ethylene ether, and in 112 cases a local anesthetic was used. In the second group of 846 cases, there were 792 cases of spinal anesthesia, and only 54 cases in which a general anesthetic, administered intratracheally, was used. The use of spinal anesthesia in conjunction with chemotherapy and the antibiotic drugs we believe explains the difference in the mortality of 3.5% in group 1 and the 1.4% mortality of group 2, since it has so effectively reduced the incidence of fatal pulmonary complications.

In analyzing our results, we have noted that the mortality rate for gastric ulcers in group 1 was higher than it was for duodenal ulcers. We feel that this was due to the fact that we did many high gastrectomies, almost to the esophagus, leaving only the cardiac dome of the stomach intact, for gastric ulcers lying high up on the lesser curvature of the stomach. It is plausible that in surgery so close to the diaphragm, such as in a high gastric resection or a complete gastrectomy, the incidence of pulmonary complications would be greater.

In our first series the 3.2% mortality for duodenal ulcers is very low because many of these patients had

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previous gastric surgery. If we were to separate these cases from the primary resections in the first group in which no previous gastric surgery had been done, our mortality would range from 1 to 2%. We feel that the number of deaths following subtotal gastrectomy for duodenal ulcers in group 2 illustrates that the mortality rate will never be much lower because of the incidence of postoperative complications from pulmonary emboli sms, cerebral hemorrhages, hemiplegia, and coronary thrombosis, the greatest percentage of which occur in older patients. In group 1 we had two deaths in older patients from hemiplegia, and one death due to coronary heart disease. That the mortality rate was low enough to justify this surgical procedure is evident in group 2, in which there were only four deaths reported out of 614 cases of subtotal gastrectomy for duodenal ulcer. The statistics in both groups demonstrate that we did not select our cases, since 256 of our patients were in the seventh decade of life, and 24 in the eighth decade. Many of these were not good surgical risks.

GASTRIC ULCERS

We believe that gastric ulcers should always be treated surgically. There is no method for definitely diagnosing a gastric lesion as an ulcer or a beginning carcinoma without a microscopic study of a serial section of the lesion. Until a serologic test for carcinoma is discovered, such as we have for syphilis, we feel that these lesions require surgical treatment. Another factor that must be considered is penetration of the gastric lesion into the pancreas or the lesser peritoneal cavity. This causes severe symptoms, and may terminate with an erosion of a large branch of the left gastric artery. As a consequence, a severe hemorrhage usually follows that may prove fatal. The clinical end result and mortality of medical treatment over a long period of years compared to the 1 and 2% mortality of subtotal gastrectomy is the determinant factor in favor of surgical intervention in these cases.

DUODENAL ULCERS

Our attitude toward the proper type of therapy for duodenal ulcers is quite different; first, because of the extreme rarity of carcinoma of the duodenum, and, second, because of the spontaneous tendency of ulcers on the anterior wall of the duodenum to heal.

We feel that every patient with a duodenal ulcer irrespective of his economic condition should have the benefit of at least one thorough course of medical management. The length of such treatment, and the number of times it should be repeated, is contingent on economic factors and the patient's subsequent symptoms. Our experience has shown us that patients with ulcers that are not bleeding or perforating are usually relieved of their symptoms after rest in bed for two weeks and routine medical management. The most important factors in conservative therapy are complete rest, change of environment, and escape from the strain and worries of daily life. Patients who have been under medical management on two or more occasions and find that their relief is only temporary usually prefer surgery to further treatment. If a patient who is an ordinary wage earner has repeated attacks of his ulcer symptoms following thorough medical treatment, we advise surgery rather than further medical management. We have learned from our social service department that the majority of these patients are unable to meet the expenses of prolonged medical treatment, since they depend economically on their wage earning ability, and as soon as this source of income ceases they must seek financial assistance from charitable organizations. However, if the patient has an ulcer that might heal under medical management and he can afford the time and expense of such therapy, we allow him to do so, but always informing him of the danger of a fatal hemorrhage or a perforation.

However, if the roentgen examination reveals a duodenal ulcer with a clover-leaf deformity, there is almost no possibility that it will heal under medical management. The majority of clover-leaf deformities of the duodenum are due to ulcers on the posterior duodenal wall, penetrating into and adhering to the pancreas. This penetration causes contraction of the duodenum, the surrounding mesentery, the hepatoduodenal ligament, and the capsule of the pancreas, and results in dilatation and formation of diverticula and deformities of the duodenum proximal to the point of contraction. A patient with a lesion of this type suffers not only from the duodenal ulcer, but also experiences pain and distress when the stomach must force food through a contracted duodenum that has produced a partial obstruction.

BLEEDING ULCERS

It is sometimes difficult to decide whether a bleeding duodenal ulcer should be treated conservatively or with surgery. If a patient presents a history of a previous hemorrhage, he should be operated on within a short time after the second hemorrhage subsides so that he is not subjected to the dangers of a third hemorrhage. If previous roentgen examination of a patient with an acute hemorrhage has revealed a gastric ulcer on the lesser curvature of the stomach, an immediate blood transfusion should be given. In these cases immediate surgery is necessary in order to stop the hemorrhage. The hemorrhage usually occurs from a large branch of the left gastric artery, and there is danger that the patient may bleed to death. The same measures should be taken with patients who have a marked deformity of the duodenum, and have a second hemorrhage. This is usually indicative of a deep penetrating posterior wall duodenal ulcer. If the diagnosis has been confirmed by previous roentgen examination, immediate surgical intervention is indicated, as the site of the bleeding is a pumping vessel of the pancreaticoduodenal artery. A gastrojejunal ulcer that begins to bleed severely should also have direct surgical treatment. The ulceration is usually located on the mesenteric side of the jejunum where the hemorrhage originates from one of the mesenteric vessels. The bleeding from an anterior wall duodenal ulcer in a young patient can ordinarily be arrested by conservative medical management, but bleeding ulcers in patients over 50 frequently require surgery. These lesions do not respond to medical therapy due to sclerotic changes in the blood vessels.

We feel that it cannot be emphasized too often that immediate surgical intervention is necessary for hemorrhages from (1) the known ulcer on the lesser curvature of the stomach, (2) the posterior wall penetrating ulcer,

that has eroded into the pancreaticoduodenal artery, and (3) the gastrojejunal ulcer that has eroded into the mesenteric vessel of the jejunum. Operation should be limited to a simple ligation of the bleeding vessels, and subtotal gastrectomy deferred until the patient is in good condition. A hemorrhage from any of these locations is usually

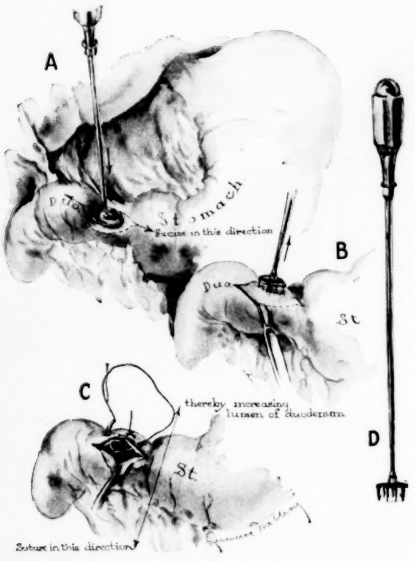

Fig. 1.—Operative procedure devised for treatment of perforated duodenal ulcer. *A* and *B*, excision through the pyloric ring into the duodenum with the perforation held in place by the fishhook spear. *C*, transverse suturing of normal tissue with fine catgut and inversion wax silk suture after excision of the defect. *D*, fishhook spear devised to hold perforation in place.

so severe and exsanguinating that immediate surgery is indicated to stop the bleeding and save the patient's life. Bleeding ulcers in other locations of the stomach do not require such emergency measures as the hemorrhage is much less severe.

PENETRATING ULCERS

Patients with acute symptoms of penetrating ulcers are kept on medical management from 10 to 14 days, when their symptoms usually subside and a subtotal gastrectomy can be done. We also treat patients with a retention from a pyloric or duodenal obstruction medically for 10 to 14 days, and institute continuous gastric suction through a Levine tube. This decreases the distention of the stomach, reestablishes its tonus, and relieves the inflammatory process in the duodenum and in the stomach wall. During this period the electrolyte balance is corrected by liberal infusions of glucose, saline, and amino acids. Several blood transfusions are also given.

TREATMENT FOR A RUPTURED DUODENAL ULCER

The ulcer area in a case of acute duodenal perforation should be widely excised, and the open area of the stomach anastomosed to the duodenum. If a gastroenterostomy is done in the presence of an acute perforation, we have found that in most of these cases a gastrojejunal ulcer forms shortly after the procedure. If a simple closure of the perforation is done and omentum is sutured over it, within six months to a year an obstructive duodenal ulcer usually occurs. For this reason, we resect a wide area around the perforated ulcer and close the defect (fig. 1). We have devised a simple instrument for this procedure (the metal fishhook type spear shown in fig. 1*D*) to hold the perforation in place. This is placed over the perforation, and forced through the muscular walls of the infiltrated areas (fig. 1*A* and *B*). A longitudinal elliptical incision is made through the pyloric ring into the duodenum. This is indicated by the dotted line in figure 1*A* and *B*. The entire area is widely excised, leaving only normal tissue, and then sutured transversely with fine catgut and a fine layer of inversion wax silk suture (fig. 1*C*). The area may be covered over with omentum. Our experience has shown us that there is a much lower percentage of recurring obstructive ulcers with this procedure than in cases in which a simple closure is done without excision of the perforated ulcer.

PATHOLOGICAL CONDITION

The chronic duodenal ulcer that is seen at surgery usually shows a marked contraction of the duodenal wall, with diverticula producing the clover-leaf deformity. The stomach is edematous and hypertrophied in appearance, and there is associated marked gastritis and duodenitis of various degrees. More than 75 to 80% of these patients have posterior wall ulcers penetrating into the head of the pancreas. The head of this organ is usually harder than normal, and slightly adherent to the pyloric ring and

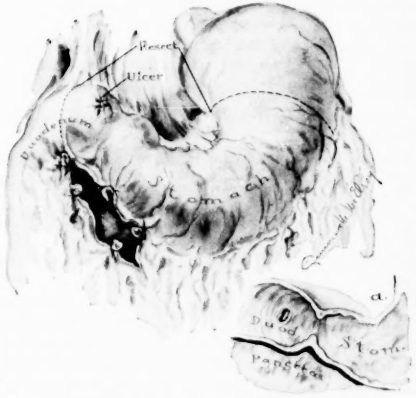

Fig. 2.—Ligation of blood supply to the greater curvature near the pylorus, and relationship of duodenal ulcer to the pyloric ring.

antrum and to the first portion of the duodenum. The serosa of the duodenum and the hepatoduodenal ligament are adherent and markedly thickened, and the stomach wall is also thickened in its lower third.

To achieve successful clinical end results with subtotal gastrectomy, we have formulated two definite principles: (1) all the pathological tissue should be removed

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if possible, and (2) from two-thirds to three-fourths of the stomach should be resected. We consider a rapid emptying time of 15 to 30 minutes ideal. This signifies that the stomach is only functioning from three to four times daily for 15 minutes, and is at rest the remainder of the time. We have also learned by studying the emptying time of stomachs following gastric surgery in which either a pylorectomy was done or too high a resection was performed that the stomach empties more rapidly and efficiently when three-fourths is resected. At this point it must be emphasized that the stomach varies in different persons as to size and configuration. Therefore one has to visualize the structure in its entirety to determine the proper level of resection.

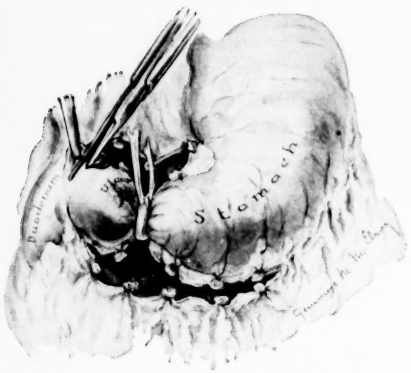

Fig. 3.—Division of anterior duodenal wall beyond the ulcer.

The various pyloroplasties, such as the Finney, Judd, Balfour, Horsley, and Heineke-Mikulicz types, have little value in therapy for duodenal ulcer, particularly for lesions that have penetrated to the pancreas. A well functioning gastroenterostomy cannot be considered as a satisfactory operation because of the high percentage of gastrojejunal ulcers occurring after this procedure. This has been reported in various clinics throughout the world, with incidences varying from 12 to 35%. In analyzing this evidence it is obvious that subtotal gastrectomy is the procedure of choice for duodenal ulcer. The mortality with this operation is very little higher than that of gastroenterostomy, and the incidence of gastrojejunal ulcers is only about 1%. Rather than subject a patient to a gastroenterostomy or another plastic operation, all of us in the gastrointestinal group would rather continue medical therapy.

SURGICAL TECHNIQUE

In doing a subtotal gastrectomy, we use a no-clamp method of the posterior Polya type. Through a median right rectus incision, the stomach is exposed. The prepyloric region is mobilized by forcing the index and middle finger through the lesser omentum along the posterior wall of the stomach. The blood vessels along the greater curvature of the stomach are clamped and ligated for about 2 in. (5 cm.) (fig. 2). The blood supply along the greater and lesser curvature of the duodenum is freed beyond the point where the duodenum is divided, which is usually just beyond the ulcer (fig. 3). A small piece of tape is tied around the pyloric end of the stomach to prevent the gastric contents from passing through the pylorus. This is tied off in place of using a clamp. The anterior wall of the duodenum is opened with a scissors below the point of the ulcer in the normal portion of the duodenum. After carefully determining its relationship to the common duct, the contents are then emptied by suction. The posterior wall of the duodenum is divided through the mucosa and the muscularis below the point of the ulcer and the contracted portion of the duodenum (fig. 4). It is freed by sharp scalpel dissection from the head of the pancreas where it is adherent due to penetration or perforation (fig. 5 and 6). It comes off very easily and the dissection is almost bloodless. The divided duodenum is now covered with a piece of gauze to prevent soiling (fig. 7). The inflammatory tissue resulting from penetration of the ulcer into the pancreas is usually scraped out with a dull curette, and touched with some tincture of iodine or thimerosal (merthiolate®) solution. This new method of dividing the duodenum below the point of the ulcer, below the point of the pathological condition, and freeing it from the head of the pancreas, is not only more rapidly accomplished but is much simpler. There is also much less danger of dividing or injuring the pancreaticoduodenal artery and the blood supply to the pancreas and duodenum. There is almost no danger of injury to the common duct, as it has been previously exposed. By dividing the duodenum below the ulcer, a free and loose duodenal wall results that can be closed as easily as a normal duodenum. We have used this technique in about 500 selected cases over a period of 10 years in preference to the older method described by us 25 years ago. With the older technique, the pancreas was freed away from the posterior wall of the duodenum, beginning at the pyloric end of the stomach, and dissected on down the posterior wall of the duodenum. This required more time, was more tedious, and made the closure of the duodenum much more difficult. The distal end of the duodenum is closed by inverting it with two rows of wax silk sutures using the Connel stitch

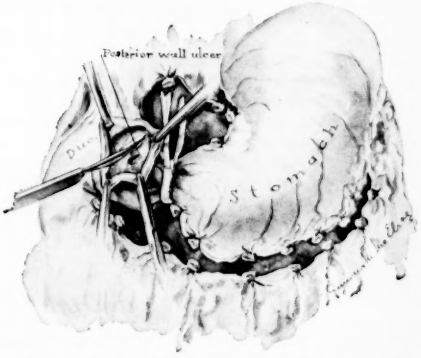

Fig. 4.—Incision of the posterior duodenal wall beyond the ulcer.

(fig. 8*A* and *B*). A third row is used to bring the lesser omentum and the capsule of the pancreas over the anterior portion of the duodenum (fig. 8*C* and *D*).

The blood vessels along the greater curvature are ligated between clamps until about 75% of the stomach is free. It is best to reach up to the cardia of the stomach

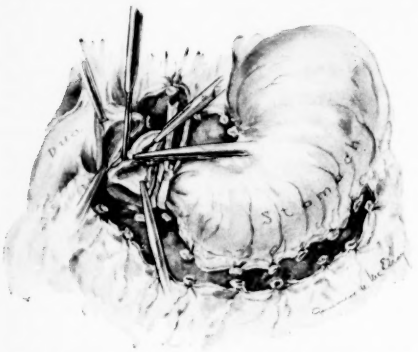

Fig. 5.—Dissection of the posterior duodenal wall from the head of the pancreas.

to estimate and see the size of the stomach, as it varies greatly in different patients. The blood supply along the lesser curvature is divided at about the junction of the middle and upper third of the stomach (fig. 9). The mesocolon is lifted up and is split on the left side of the middle colic artery. The left half of the mesocolon is sutured with interrupted silk sutures to the posterior wall of the stomach as high up as possible (fig. 10).

The first loop of jejunum as close to the ligament of Treitz as possible, usually about 1½ in. (3.8 cm.), is brought through the mesocolic slit, and sutured to the posterior wall of the stomach with continuous gastrointestinal catgut (fig. 11). The relationship of the jejunum to the remaining portion of the stomach is such that the proximal end of the jejunum is attached to the lesser curvature and the distal end to the greater curvature (fig. 11). The muscularis of the stomach and the jejunum is divided down to the submucosa about 4 mm. from the first suture line, and sutured with gastrointestinal catgut (fig. 12*A*). An opening is made through the mucosa of the posterior wall of the stomach, and the contents aspirated (fig. 12*B*). The jejunum and the posterior wall of the stomach are sutured with gastrointestinal catgut, starting at the middle of the posterior wall, using interlocking stitches (fig. 13) and continuing toward the greater and lesser curvatures.

The stomach is removed by cutting away the anterior wall, where vessels are clamped and ligated (fig. 14). The greater and lesser curvatures and the anterior wall are closed by continuous catgut, using the over and over oblique stitch (fig. 15*A*), which we devised in 1912. This suture only inverts a very small portion of the edge of the jejunum and the gastric wall (fig. 15*C*). A second layer of gastrointestinal catgut is used employing the Cushing stitch (fig. 15*B*). The anterior wall of the anastomosis is completed with a third row of continuous wax silk sutures. The right portion of the split mesocolon is sutured high on the anterior wall of the stomach so that the anastomosis is well below the mesocolon (fig. 16). Figure 17 illustrates the relationships. Figure 18 shows a high gastrectomy in which the mesocolon was short, and could not be brought over the anastomosis to the anterior surface of the stomach. If, in a high resection, the mesocolon is fat, we do not suture the mesocolon too high because of interference with the chest wall. We feel that it is much better to leave it in its normal position, and we have never seen any mechanical difficulty resulting from this. We never suture the split mesocolon to the jejunum, and have had no difficulties with this method. The mesocolon becomes agglutinated within a few hours after the operative procedure. We have never had a herniation through the small mesocolic slit.

CLINICAL END RESULTS

In a follow-up of 1,200 of these patients in both groups, we found that 95% were free of symptoms, had gained from 15 to 50 lb. (6.8 to 22.7 kg.), were on a full diet, and required no medication. A small number complained of fullness after eating, perspiration and weakness, and cardiac palpitation after each meal that asts from 10 to 30 minutes. These symptoms disappeared after three to six months, and can be ascribed to a reflex of the vagus nerve and its branches. In a number of patients these symptoms disappeared after the stomach began to empty in from 15 to 30 minutes. In the remaining 5% of cases there were symptoms of distress that could not be explained on the basis of a faulty emptying time, or by roentgenological observations. Some of these were diagnosed as spastic colitis, others as visceral neurosis. Such conditions usually occur in highly emotional

Fig. 6.—Dissection of the posterior duodenal wall from the head of the pancreas completed.

persons in whom it is difficult to ascertain whether their symptoms have an organic cause.

It was also observed that in patients whose stomachs at first emptied slowly, the emptying time after three to six months was between 15 and 30 minutes. This shows that the stomach and jejunum undergo muscular changes as the result of their new mechanical function.

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The acidity following subtotal gastrectomy corresponds with that reported by Berg and Lewisohn. At the end of two weeks, 5% of these patients showed a free acid of from 10 to 15 units, with a total acidity of from 25 to 30 units. In the remaining group, there was no free acid, and the total acidity was from 5 to 10 units. Subsequent follow-up revealed no change from the immediate postoperative analyses. We believe that the low acidity among these patients can be attributed to the rapid emptying time of the stomach achieved by a high resection, preventing reflex irritation and the formation of hydrochloric acid. There has been almost no change in the blood picture postoperatively. Both the hemoglobin level and red blood cell count remained the same or increased slightly.

SUMMARY AND CONCLUSIONS

Experience with gastric resection over a period of 33 years in the stomach groups at Michael Reese Hospital, Mount Sinai Hospital, and the Franklin Boulevard Community Hospital have led us to the conclusion that the mortality in 1,796 nonselected cases of gastric, gastrojejunal, and duodenal ulcers justifies subtotal gastrectomy as the operation of choice for the surgical treatment of an ulcer. In group 1, in which there were 950 cases, the mortality was 3.5%, and in group 2, in which there were 846 cases, it was 1.4%.

The technique of a posterior Polya mesocolic resection, with the anastomosis across the entire width of the stomach, has been most satisfactory. That it presents very little mechanical difficulty is shown by the small number of cases in group 1 in which it was necessary to use a Levine tube with Wangensteen suction to aspirate the stomach.

While gastroenterostomy usually produces gastrojejunal ulcers in 20 to 30% of the cases, this complication occurred in less than 1% in our series following high subtotal gastrectomies. Other plastic operations are also unsatisfactory, since there is often a recurrence of the ulcer.

The removal of about 75% of the stomach is one of the important factors in the success of subtotal gastrectomy. The amount of stomach resected does not affect the mortality and morbidity. Subtotal gastrectomy is indicated for patients with a history of a second hemorrhage, a mechanical obstruction of the pylorus or duodenum, or those who have not responded to medical therapy after a sufficient trial. Medical treatment should be instituted in patients with slight symptoms, but those whose symptoms interfere with earning their livelihood should be treated surgically.

In 93 cases in which we did a cholecystectomy in addition to the subtotal gastrectomy, the morbidity or mortality did not rise. We believe in doing a cholecystectomy only if cholelithiasis is present.

The clinical end results in 1,200 cases in which a subsequent follow-up was done revealed that 95% of the patients were well, on a full diet without medication, had a normal blood picture, and showed an increase in weight from 15 to 50 lb. (6.8 to 22.7 kg.). All this should be ample proof that this operation, although a major surgical procedure, justifies itself.

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ANTIBIOTICS IN TREATMENT OF PANCREATIC FIBROSIS, WITH EMPHASIS ON TERRAMYCIN

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The beneficial effects of aureomycin in the management of patients with pancreatic fibrosis (mucoviscidosis) have been demonstrated.[1] An extension of observations begun three years ago, and including over 100 patients, shows a favorable response in over 90%. Anticipation of the appearance of refractoriness to aureomycin and the poor response of the occasional patient to aureomycin suggested the use of terramycin.[2] The present report is an evaluation of terramycin in the treatment of 49 patients with pancreatic fibrosis. All patients, with two exceptions (the patients in cases 2 and 3), had pulmonary infections of varying severity. A brief note concerning the efficacy of terramycin has been made.[3] A full description of this disease is given elsewhere.[4] The main clinical features drawing attention to this condition in early infancy are hunger, with failure to gain weight on an adequate caloric intake; the passage of large, foul, and frequent stools; chronic cough; and excessive sweating. The index of suspicion should be high when examining siblings of a child with a proved case. Although a variety of laboratory examinations have been described to aid in establishing a diagnosis,[5] the most reliable one is an examination of the duodenal fluid obtained by intubation. The duodenal fluid in a typical patient is scanty and has increased viscosity and absent to markedly reduced pancreatic enzyme activity (trypsin, carboxypeptidase, lipase, and amylase). Observations from this laboratory indicate that all these criteria need not be present in every patient with this disease.

The most incapacitating feature of the disease, and the chief cause of death, is chronic pulmonary infection. The earliest respiratory symptom is usually cough, which often appears during the first few months of life. The cough may become increasingly severe and is associated

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The terramycin used in this study was supplied by Dr. Gladys L. Hobby and Dr. W. Alan Wright of the Chas. Pfizer & Co., Inc., Brooklyn.

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with wheezing respirations or dyspnea; or it may become paroxysmal, suggesting pertussis. Repeated attacks of upper respiratory tract infections and bronchopneumonia are common. Progression of the pulmonary process may lead to bronchiectasis, empyema, and lung abscesses. Staphylococci are constantly found in association with the pulmonary infection.

Many patients show evidences of growth retardation and malnutrition. Some have a protruding abdomen and a prominent forehead. Those patients with advanced pulmonary infection are dyspneic and may have a typical cough, an emphysematous chest, clubbing of the fingers, cyanosis, and decreased vital capacity and exercise tolerance. On the other hand, patients with minimal involvement may present no abnormal physical findings. Roentgenograms of the chest in the early stages of the disease show hyperaeration with minimal evidence of infection. As the disease progresses, there is evidence of diffuse, patchy areas of emphysema and atelectasis, with dense hilar shadows.[6] Occasionally the chest roentgenogram may be sufficiently suggestive to give the clinician the first clue as to the presence of this disease.

In the management of these patients emphasis has shifted from the nutritional aspects to attempts at control of the associated pulmonary infection. The nutritional regimen consists of a high caloric, high protein diet with some restriction of fat and a liberal daily allowance of water-miscible multivitamin preparations. In small infants protein hydrolysates are freely prescribed. In addition, pancreatic substitution products [7] are administered to these patients at meal time.

In the control of the pulmonary infection numerous chemotherapeutic and antibiotic agents have been employed, either singly or in combination. Several sulfonamide compounds have been used, with temporary improvement in some patients. Penicillin and streptomycin have been employed both systemically and by aerosol. Administration of these antibiotics by aerosol has proved effective, especially when given for short periods; however, prolonged use is burdensome and often results in a diminished response. The introduction of aureomycin has resulted in a remarkable alleviation of the symptoms of most patients. A beneficial effect has been observed even in those patients with far-advanced bronchiectasis. Unfortunately, relapses of the pulmonary infection occur soon after the complete withdrawal of aureomycin, so that prolonged daily therapy is necessary. Some patients who responded well to aureomycin when it was first employed showed a poor response or no beneficial effect after a prolonged period of therapy. In addition to the control of the pulmonary infection, the treatment of the pulmonary involvement in this disease should be directed toward liquefying the thick, tenacious mucus that seems to be responsible, in part at least, for the associated obstructive phenomena.

The outlook for children afflicted with pancreatic fibrosis has been considered hopeless in the past. This pessimistic attitude is being modified as newer knowledge and greater experience are obtained. The increased clinical awareness of this condition in recent years has resulted in the recognition of many cases at an earlier age than was formerly the case. The prognosis in those patients with minimal pulmonary involvement, or in those in whom the disease is recognized early, should be much better than it was formerly.

PLAN OF STUDY

A total of 49 patients are included in this study, which was started in February, 1950, and continued through May, 1951. In each patient the diagnosis of pancreatic fibrosis was made by examination of the duodenal fluid. In many instances the diagnosis was corroborated by failure to find trypsin in one or more stool specimens,[5c] by failure of the patient to digest gelatin as determined by plasma glycine measurements,[5b] and by the patient's failure to absorb vitamin A when it was fed in an oily base.[5a] These patients were followed either in the hospital or at frequent intervals on an outpatient basis. The patients ranged in age from a few days to 16 10/12 years. They are divided into three groups as shown in table 1.

Group A consists of 13 patients who were treated with terramycin as the sole antibiotic from the time of diagnosis. Group B consists of 16 patients who had been treated with aureomycin as the only antibiotic prior to the administration of terramycin. Group C consists of 20 patients who had been treated with a variety of agents, such as sulfadiazine, aerosol penicillin and streptomycin, and intramuscular penicillin. In addition, aureomycin had been employed in each patient in group C for at least one year. Thus, the first group affords an opportunity for the observation of exclusive terramycin treatment, while the latter two groups permit comparison of the effectiveness of terramycin with other agents in the same patient.

At each clinic visit the history was carefully reviewed with respect to the following factors: respiratory infections, fever, cough, wheezing, exercise tolerance, physical activity, school attendance record, disposition, appetite, dietary habits, frequency and nature of bowel movements, sweating, and details of medication. The patients were weighed, measured, and examined. Laboratory examinations consisted of frequent nose and throat cul-

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6. Neuhauser, E. B. D.: Roentgen Changes Associated with Pancreatic Insufficiency in Early Life, Radiology **46**: 319, 1946.

7. Many of the patients in this report received "viokase," a specially processed preparation of desiccated and defatted whole pancreas, which was provided by E. Levin of the VioBin Corporation, Monticello, Ill.

TABLE 1.—*Summary of Data in Patients Studied*

Case	Present Age Yr.	Present Age Mo.	Age at Onset of Pulmonary Symptoms, Mo.	Age at Diagnosis, Mo.	General Condition at Start of Therapy	Weight at Start of Terramycin Therapy Lb.	Weight at Start of Terramycin Therapy Oz.	Duration of Terramycin Therapy, Weeks	Weight After Therapy Lb.	Weight After Therapy Oz.	Over-all Response to Terramycin Therapy	Comment
Group A: Patients Treated with Terramycin Daily from Time of Diagnosis												
1	..	11	8	9	Poor	10	0	9	13	10	Excellent	Also received intermittent aerosol penicillin and streptomycin
2	1	..	No symptoms	9	Good	14	8	13	18	3	Excellent	Sibling of patient in case 35; no respiratory symptoms
3	1	..	No symptoms	4	Fair	10	15	29	23	6	Excellent	No respiratory symptoms
4	1	6	1	3	Poor	11	6	56	31	0	Excellent	Cough-free; sibling died from pancreatic fibrosis
5	1	6	2	15	Poor	12	0	10	15	9	Excellent	See figures 4 and 5
6	1	8	3	17	Fair	19	0	12	21	0	Excellent	Minimal respiratory symptoms
7	2	..	5	19	Fair	23	3	21	27	8	Excellent	Rapid clearing of pulmonary symptoms
8	2	2	19	24	Poor	15	12	9	20	5	Excellent	Immediate response
9	2	2	9	22	Poor	16	0	16	18	0	Good	Advanced case; also received aerosol penicillin and streptomycin
10	3	2	24	30	Fair	19	13	31	26	0	Excellent	
11	3	4	1	36	Poor	20	0	17	25	13	Excellent	Playful and without cough for first time; see fig. 1
12	9	6	1	9 yr. 4 mo.	Fair	59	0	9	63	0	Excellent	Cough improved rapidly
13	16	10	18	15 yr. 10 mo.	Fair	128	0	54	133	8	Excellent	Clear of respiratory tract symptoms for first time
Group B: Patients Who Had Received Aureomycin as Only Antibiotic Prior to Terramycin Therapy												
14	..	9	2	1	Good	15	0	9	18	7	Excellent	Previous response to aureomycin also excellent; sibling of patient in case 23
15	1	1	1	2	Good	15	0	17	18	12	Excellent	Took elixir preparation well after refusing capsules
16	1	4	4	3	Fair	12	15	34	17	12	Excellent	Became cough-free; sibling of patient in case 38
17	1	6	2	Few days	Good	9	0	44	28	8	Excellent	Presented as meconium ileus; treated surgically
18	1	8	8	12	Poor	18	12	6	19	4	Fair	Had advanced lung involvement when first seen
19	1	8	8	16	Good	22	3	6	23	9	Excellent	Marked rapid improvement in respiratory symptoms
20	1	9	1	14	Fair	20	13	13	21	5	Fair	Vomited oral preparations; good response to terramycin aerosol
21	2	..	4	6	Fair	25	0	5	26	0	Fair	Terramycin tried after patient no longer responded to aureomycin
22	2	7	6	9	Poor	26	0	12	26	4	Fair	Advanced lung changes when first seen
23	2	8	3	18	Fair	28	8	15	30	0	Excellent	Sibling of patient in case 14
24	3	2	3	11	Good	34	0	3	35	0	Excellent	Rapid improvement in respiratory symptoms
25	3	3	1	3	Good	32	8	6	34	4	Good	Has done well with both drugs
26	3	10	1	25	Good	40	0	5	40	0	Excellent	Terramycin as effective as aureomycin
27	4 *	..	1	39	Poor	26	8	4	24	12	Poor	Advanced lung changes when first seen; died Sept., 1950
28	4	8	6	4 yr. 3 mo.	Fair	37	12	6	38	0	Good	Pulmonary symptoms cleared quickly
29	7	10	5	5 yr. 6 mo.	Good	40	0	6	40	0	Fair	Coughing more than with aureomycin; far-advanced case
Group C: Patients Treated with a Variety of Antibiotics Prior to Terramycin Therapy												
30	2	9	1	Few days	Good	28	8	13	29	0	Good	Meconium ileus; treated surgically
31	2	9	2	3	Good	26	12	4	28	4	Good	Responded better to aureomycin than to terramycin
32	3	1	5	5	Fair	22	13	10	23	5	Fair	Has mild diarrhea with aureomycin and terramycin
33	3	1	1	3	Good	26	8	5	28	8	Good	Advanced pulmonary involvement
34	3	8	1	10	Good	29	0	6	27	8	Poor	Respiratory symptoms and appetite worse; sibling of patient in case 39
35	3	9	2	18	Poor	21	8	2	21	8	Poor	No longer responding to aureomycin when terramycin was tried
36	3	11	2	3	Fair	27	4	23	28	8	Excellent	Mild case; cough-free on aureomycin and terramycin
37	4	2	6	36	Good	34	0	8	35	0	Excellent	Did well with both drugs
38	4	6 *	20	21	Poor	23	10	13	25	0	Fair	Appetite improved; far-advanced lung changes; sibling of patient in case 15; died Jan., 1951
39	4	8	3	23	Fair	30	0	3	30	14	Good	Advanced pulmonary changes; has never done as well as sibling, patient in case 34
40	4	11	3	7	Good	41	0	11	42	8	Excellent	Sibling died at seven weeks with pancreatic fibrosis
41	5	4	1	24	Poor	23	12	3	23	4	Poor	Advanced disease; markedly malnourished
42	6	3	15	22	Poor	32	4	10	32	8	Poor	Advanced involvement with bronchiectasis when first seen
43	6	9	2	24	Good	41	0	6	41	0	Good	Doing well but does better with aureomycin
44	7	10	3	4 yr. 6 mo.	Good	39	4	3½	40	4	Good	Status same when changed to terramycin
45	8	11	1	30	Fair	42	8	21	46	4	Excellent	Severe pulmonary involvement
46	9	2	4	Few days	Excellent	58	0	4	58	8	Good	Very active child with very mild cough
47	9	3	48	8 yr. 2 mo.	Good	51	0	18	55	0	Good	Bronchiectasis but remains in good control
48	10	11 *	6	19	Poor	40	8	26	39	12	Fair	No longer responded to aureomycin; improved when changed to terramycin; died in Feb., 1951
49	11	4	6 yr. 6 mo.	8 yr.	Good	49	8	4	50	8	Good	Moderately severe lung involvement

* Age at time of death.

tures, roentgenograms of the chest, and occasional hemoglobin and leukocyte counts. Photographs were taken at frequent intervals. Close contact was maintained with patient's families between clinic visits, and the patients were seen whenever there was any question of the status. Some patients reported at weekly intervals, whereas others came once every two or three months, depending on their condition and other circumstances.

DOSAGE AND MODE OF ADMINISTRATION

The oral dose of terramycin ranged from 7 to 30 mg. per kilogram of body weight per day. Smaller or less severely ill infants received as little as 50 mg. a day in one dose, whereas older or sicker patients received as much as 750 mg. a day in two or three divided doses. Most patients received the total oral daily amount in a single dose. When acute respiratory infections developed with this schedule, the dose was increased to approximately 50 mg. per kilogram per day, given two to four times daily for the duration of the infection. Occasionally during an acute infection, supplementary aerosol penicillin (50,000 Oxford units) and streptomycin (50 mg.) were administered three or four times a day for about one week. Three patients in group A (cases 1, 5, and 9) received this supplementary treatment for brief periods at the time diagnosis was established.

Terramycin was used in four forms. The gelatin capsules contained 50, 100, or 250 mg. of terramycin and were given to the older children capable of swallowing capsules. Two cherry-flavored liquid preparations, one with a concentration of 250 mg. per 5 ml. and the other with 100 mg. per 0.5 ml. (as measured by calibrated dropper), were administered to the infants or to children who could not or would not swallow capsules. The concentrated liquid preparation was particularly valuable because of the ease with which it was administered. A preparation designed for aerosol therapy was used in five patients in a 50 mg. dose per treatment for periods up to 10 days. This preparation appeared to be irritating in this concentration.

BACTERIOLOGICAL STUDIES

Nasopharyngeal and oropharyngeal cultures were taken from all patients at the start of terramycin therapy and frequently on subsequent visits. Staphylococcus aureus was isolated from the nasopharynx in all 13 patients in group A at the start of therapy. After terramycin administration, staphylococci were still present in the nasopharynx of the nine patients on whom follow-up cultures were taken, even after 13 months of continuous therapy. No striking change in the pharyngeal flora was encountered in this group.

In the 36 patients of groups B and C, the following micro-organisms were isolated from the nasopharynx at the start of terramycin treatment: staphylococci, 27 cases; Pseudomonas pyocyanea, 6; Proteus, 5; Candida coli, 2; Hemophilus influenzae, 2; and pneumococci, 1. After varying periods of treatment with terramycin the pharyngeal flora was essentially unchanged. The micro-organisms recovered in 32 of these patients were as follows: staphylococci, 23 cases; Ps. pyocyanea, 6; Proteus, 3; C. coli, 0; pneumococci, 1; H. influenzae, 2; and Neisseria catarrhalis, 1.

In some instances the in vitro sensitivity of the micro-organisms isolated was tested against terramycin and other antibiotics. At the beginning of the study a test tube titration method, a modification of that devised by Randall and co-workers [9] for penicillin sensitivity, was used. The results of the observations made on the Staph. aureus obtained at varying periods during the study were as follows: 18 of 23 micro-organisms tested were found to be sensitive to aureomycin; 17 of 22 were found sensitive to terramycin; 9 of 11 were found sensitive to penicillin; and each of 11 was found sensitive to streptomycin. The level of sensitivity is taken as 2 μg in the case of aureomycin and terramycin, 2 Oxford units for penicillin, and 0.5 mg. for streptomycin. It is interesting to note that in some of the patients who showed a very striking clinical improvement the staphylococci isolated from the nasopharynx remained resistant in vitro to terramycin. Later in the study, sensitivity determinations were carried out by a modification of Bondi's method,[10] with paper discs and disc tablets. The results of these studies indicate no consistent correlation between the sensitivity of the staphylococci isolated from these patients and the clinical response.

TABLE 2.—*Clinical Response to Therapy*

		Excellent	Good	Fair	Poor
Group A (13 patients)	Respiratory symptoms	9	2 (5, 9)*	.....	.....
	Nutritional status	12	1 (9)	.....	.....
Group B (16 patients)	Respiratory symptoms	7	4 (15, 24, 25, 28)	3 (18, 21, 29)	2 (20, 27)
	Nutritional status	7	4 (21, 25, 26, 28)	4 (18, 29, 22, 29)	1 (27)
Group C (20 patients)	Respiratory symptoms	6 (30, 36, 37, 43, 45, 49)	8 (31, 32, 33, 39, 40, 44, 46, 47)	2 (38, 48)	4 (34, 35, 41, 42)
	Nutritional status	6 (33, 37, 40, 45, 46, 47)	6 (30, 31, 36, 39, 43, 49)	4 (32, 38, 44, 48)	4 (34, 35, 41, 42)

* Figures in parentheses are case numbers. See table 1.

CLINICAL RESULTS

The clinical effect of terramycin has been evaluated under the following two categories. 1. The effect on the respiratory features, including degree, severity, and frequency of cough, frequency of respiratory infections, fever, wheezing, dyspnea, exercise tolerance, and digital clubbing. The roentgenogram of the chest was also considered in the evaluation. 2. The effect on the nutritional status and general well-being, including changes in

8. Deleted in proof.

9. Randall, W. A.; Price, C. W., and Welch, H.: Estimation of Penicillin in Body Fluids, Science **101**: 365, 1945.

10. Bondi, A., Jr.; Spaulding, E. H.; Smith, D. E., and Dietz, C. C.: A Routine Method for the Rapid Determination of Susceptibility to Penicillin and Other Antibiotics, Am. J. M. Sc. **213**: 221, 1947.

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weight, alteration in nature and frequency of bowel movements, appetite, degree of physical activity, disposition, alertness and interest, and number of days absent from school. The over-all response of each patient to terramycin is presented in table 1. Table 2 shows the clinical response to terramycin evaluated in the manner referred to above.

Respiratory Symptoms.—All patients in group A showed pronounced improvement in respiratory symptoms. Improvement in cough was the most striking change and usually occurred within a week after the institution of therapy. This improvement occurred in spite of the fact that some of these patients had severe and prolonged symptoms with presumably irreversible changes. The parents of several of these patients made the comment that their child was free of cough for the first time since birth. Figure 1 demonstrates the improvement in the roentgenogram of the chest of the patient in case 11. This child had been troubled from the age of one month with a cough severe enough to keep him and his family awake many nights. The diagnosis was made when he was three years of age. Within a week after the

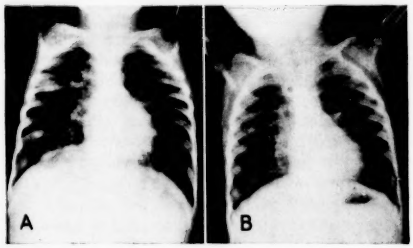

Fig. 1.—Roentgenogram of the chest of patient in case 11, *A*, before being given terramycin and *B*, seven weeks after start of terramycin therapy, 250 mg. daily.

institution of terramycin therapy he became cough-free and has remained so through the date of this report, a period of four months. Similar responses were noted in the other patients in group A. Changes also occurred in the objective physical findings, such as the disappearance of rales and the improvement in dyspnea and cyanosis when these were present. Digital clubbing became less pronounced in some patients. Acute infections of the respiratory tract occurred infrequently in this group, and the infections were not severe when they did occur. Usually the patient responded quickly when the amount of terramycin administered was increased temporarily.

The evaluation of the response of patients in groups B and C was more difficult, because these patients had already received antibiotics for varying periods of time. The patients in group B had previously shown the same dramatic response when first given aureomycin. The patients in these groups were generally older and had more advanced pulmonary disease. For the purpose of the study, terramycin was substituted for aureomycin at the same dosage level. From previous experience it was known that the discontinuance of aureomycin would result in a recurrence of respiratory symptoms; therefore, if a patient who had been relatively free of respiratory symptoms with aureomycin therapy continued to do well or did better with terramycin, the response was considered "good" or "excellent." If a patient was relatively

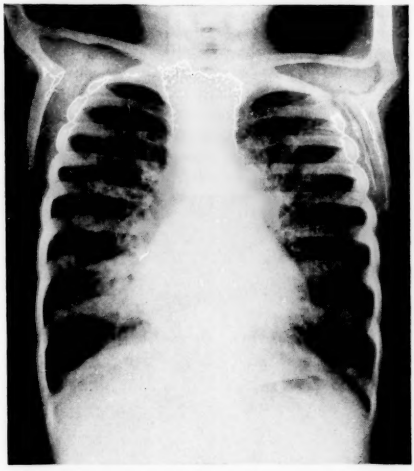

Fig. 2.—Roentgenogram of the chest of patient in case 27 taken one month before death.

free of respiratory symptoms with aureomycin therapy but showed evidences of relapse with terramycin, the response was considered "poor." Other patients, who were doing only fairly well or poorly with aureomycin

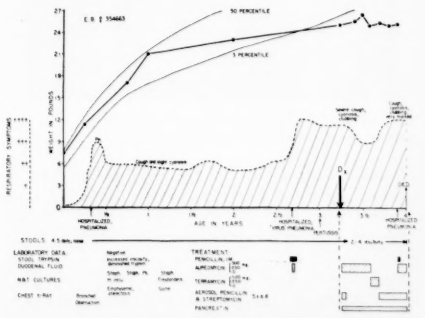

Fig. 3.—Course of patient in case 27. Note failure to respond to treatment. This patient had far-advanced pulmonary disease when a diagnosis was made at the age of 3 3/12 years.

therapy, improved somewhat with terramycin and were considered to have had a "fair" or "good" response. Still others in these groups were doing poorly with aureomycin therapy and continued to respond poorly to terramycin therapy.

Three patients (cases 27, 38, and 48) who had an initial poor or fair response to terramycin are now dead. The postmortem examination in each case showed far-advanced bronchiectasis, with patchy areas of emphysema and atelectasis. The roentgenogram of the chest of the patient in case 27, taken one month before death, is shown in figure 2. This patient's course is presented in figure 3.

General Well-Being and Nutritional Status.—Improvement in well-being and nutritional status was most marked in the patients in group A. Concomitant with improvement in respiratory symptoms, there was increased physical activity and rapid gain in weight, often accompanied by striking improvement in disposition. The few children who had poor appetite as a result of severe pulmonary

Fig. 4.—Photographs of patient in case 5, *A*, taken at time of diagnosis and *B*, 10 weeks later after treatment with terramycin.

infection regained their former excellent appetite. In general, physical development was accelerated in cases in which it had been retarded prior to therapy. The remarkable gains in weight after the institution of terramycin therapy in the patients of group A is shown in table 1. Figures 4 and 5 illustrate the changes observed in the patient in case 5. Patients in groups B and C showed a less dramatic improvement in weight and general well-being than those in group A; however, improvement in the nutritional status took place in the majority of patients (table 1).

SPECIAL PROBLEMS IN MANAGEMENT

Relapse.—In general, when terramycin therapy was discontinued for brief periods and no other antibiotic was substituted, the recurrence of pulmonary symptoms was noted. With the resumption of terramycin therapy, these symptoms disappeared. This has been our previous experience with aureomycin. It appears, therefore, that prolonged and continuous antibiotic therapy is necessary if respiratory symptoms are to be kept at a minimum.

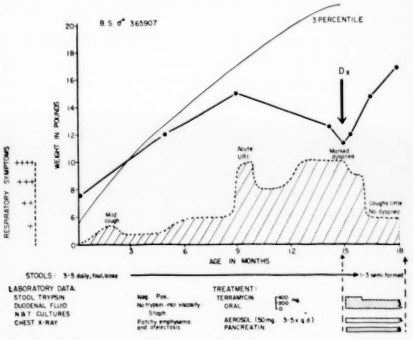

Fig. 5.—Course of patient in case 5. Note rapid gain in weight and improvement in respiratory symptoms after the beginning of terramycin treatment. URI = upper respiratory infection.

Undesirable Reactions.—In the dosage schedule employed, terramycin did not produce any undesirable reaction, except for one patient in whom mild diarrhea developed (case 32). One patient (case 30) who vomited

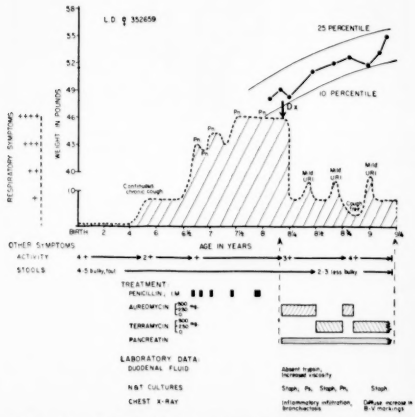

Fig. 6.—Course of patient in case 47. She had a favorable clinical response with both aureomycin and terramycin. Note the late age at which diagnosis was made. This patient had many attacks of pneumonia in the two years prior to referral to this clinic. There was no history of pulmonary symptoms during the first four years of life. Pn = pneumonia, URI = upper respiratory injection, and BV = bronchovascular.

when terramycin was given in capsules tolerated the drug well when it was given in concentrated liquid form. Another patient (case 20) vomited the oral preparations for a short time and was later able to tolerate the drug and responded to terramycin aerosol.

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Refractoriness.—A diminishing clinical response to terramycin with prolonged therapy has not yet become a problem. Those persons whose initial response was good or excellent continue to do well. Judging by our experience with aureomycin, we anticipate some degree of refractoriness after prolonged therapy. Two patients (cases 38 and 48) had an initial favorable response to aureomycin but failed to respond after prolonged treatment. When the therapy was changed to terramycin, one patient (case 38) showed no improvement while the other patient (case 48) showed some temporary improvement. Both patients have died.

COMPARISON OF RESULTS WITH TERRAMYCIN AND AUREOMYCIN

Table 3 compares the clinical response of the 36 patients in groups B and C. Twenty-two responded equally well to both drugs; seven had a somewhat better response to terramycin and seven to aureomycin. Thus it would appear that the two drugs are equally efficacious in the management of pancreatic fibrosis. Figure 6 presents more detailed data on a patient who had a good response to both drugs.

COMMENT

The improvement that may follow antibiotic therapy can be so striking that the clinical appearance of the patient may cause one to question the validity of the original diagnosis. In spite of this clinical response, repeat duodenal fluid studies will reveal the characteristic findings that originally led to the diagnosis. Indeed, the withdrawal of therapy usually brings on a recurrence of former respiratory symptoms. We should like to emphasize the importance of establishing a diagnosis early so that therapy can be started before extensive pulmonary lesions become well established. The failure of therapy in a patient with extensive pulmonary involvement, as in the patient in case 27, is understandable and in contrast to the excellent response in the patient in case 4, whose treatment was begun at 3½ months of age. Another reason for starting therapy early is the observation that infants may have more trouble with thickened bronchial secretions and are more likely to die from the disease than older children. In the group of patients discussed, the diagnosis was established when they were under 3 months of age in 11 instances, under 9 months in 18 cases, and under 2 years in 36 cases (73.5%). The onset of pulmonary symptoms was noted in 26 patients before the age of 3 months, in 14 patients between 3 and 9 months, and in 7 patients over the age of 9 months. Two patients show no pulmonary symptoms at the time of this report.

Although great strides have been made in the early recognition of this disease, we must attempt to shorten further the span between the appearance of symptoms suggesting this condition and the date of establishing a diagnosis and instituting therapy. In this study approximately 54% of the patients had pulmonary involvement as demonstrated clinically and/or by roentgenogram by the age of 3 months; however, in only 22% was the diagnosis made by this age. It appears that the age at the time of diagnosis and establishment of a sound therapeutic regimen may be one of the deciding factors in the outcome. The severity of the disease is equally important, however, and this is oftener reflected by the intensity of the pulmonary symptoms than by the degree of gastrointestinal dysfunction. It is too early to draw conclusions as to the eventual outcome of these patients; nevertheless, comparison with the best results obtained prior to three years ago would be most favorable. The only major change in our therapeutic program has been the introduction of the newer antibiotics. The formerly used agents, such as sulfadiazine, penicillin, and streptomycin, were effective and often produced favorable results. The combined use of penicillin and streptomycin in aerosol form, 50,000 units of the former plus 50 mg. of streptomycin from two to five times daily, is still useful in the most refractory cases. In these same persons the use of a combination of agents may be most effective, such as combinations of penicillin and streptomycin in aerosol form, orally administered terramycin, or aureomycin plus sulfadiazine. Our experience with chloramphenicol (chloromycetin®) is limited, and it has been thought useful in the most advanced cases when combined with other drugs. The use of chloramphenicol alone in some early cases did not seem to be as satisfactory as either aureomycin or terramycin. Further experience is necessary for proper evaluation of this drug. We have been impressed with the effectiveness of sulfadiazine after prolonged periods of aureomycin or terramycin therapy. In the past we had been limited in the number of effective agents, but today, with so many, the rotation from one effective drug to another may become the ideal form of therapy.

TABLE 3.—*Comparison of Aureomycin and Terramycin Therapy in Groups B and C (Thirty-Six Patients)*

Response to Terramycin	Response to Aureomycin *			
	Excellent	Good	Fair	Poor
Better (7)	.....	15, 16, 17, 24	39	45, 48
Equal (22)	14, 19, 23, 26, 37, 40	25, 28, 30, 33, 36, 44, 46, 47, 49	18, 20, 21, 22, 32	27, 38
Worse (7)	31, 43	29, 34	35, 41, 42	

* Figures in these columns are case numbers.

The emergence of resistant strains of staphylococci in the respiratory tract and the appearance of a new flora with resistant micro-organisms were problems of great concern when this study was started. Ps. pyocyanea was recovered with greater frequency in those patients treated with a variety of antibiotics over prolonged periods of time; however, in those patients treated with terramycin alone and for relatively shorter periods the bacterial flora of the nasopharynx showed little change. We were alert for the occurrence of moniliasis, but this complication did not occur except in a few patients terminally. The emergence of terramycin resistant staphylococci in vitro did not correlate with the therapeutic response. In spite of the presence of resistant staphylococci in the nasopharynx, patients continued to show a favorable clinical effect. This suggests that terramycin may have an action other than a pure antibacterial one. A similar

action was suspected in the case of aureomycin. In studying the action of aureomycin in patients with pancreatic fibrosis, Stowens [1b] points out from his nitrogen balance studies an almost fourteenfold increase in the amount of nitrogen retained. He attributes this to three factors: (1) an increase in the amount of nitrogen voluntarily ingested, (2) an increase in the amount of nitrogen absorbed, and (3) an increase in utilization of absorbed nitrogen. An action similar to this in the case of terramycin has not been demonstrated but would appear likely. The weight gains recorded in table 1 of patients receiving terramycin as the sole antibiotic are very striking. This is especially true when one notes that in many instances there was insignificant or no weight gain for weeks before the institution of therapy. The gains recorded are in the same range of magnitude or slightly higher than those reported by Stowens, who used aureomycin. Whether this is due to differences in diet or to the use of pancreatin in most of our patients is difficult to say. We felt that the administration of pancreatin was advisable in view of its effect in improving nitrogen absorption. Pancreatin per se has no ameliorative effect on the respiratory tract symptoms. A few patients were treated without pancreatin for varying periods of time, and it was felt that this product did not interfere with our appraisal of antibiotic therapy. The changes in the intestinal bacterial flora have not been studied by us. Terramycin alone does not improve the defective proteolytic action in the small intestine, as determined by oral gelatin feedings and by comparison of the plasma glycine nitrogen of a two hour postprandial specimen with a fasting specimen. In this regard terramycin does not behave like pancreatin. It should also be noted that failure to absorb vitamin A in an oily base persists with this antibiotic therapy.

Although emphasis in this presentation is given to the antibiotic agent, other aspects of management must not be neglected. Our dietary regimen includes a high caloric diet with a high protein and slightly reduced fat intake, and a high water-miscible, multivitamin intake plus the addition of pancreatin. The use of such agents as iodides, antihistamines, and bile salts may have a place in selected circumstances; however, since these measures alone do not produce striking improvement in most patients with pulmonary involvement, the greatest part of the favorable response must be attributed to the daily use of the antibiotic.

The inclusion of two patients (cases 17 and 30) who had meconium ileus at birth should be noted. In these infants, the clinical and laboratory features of pancreatic fibrosis have developed and have responded to therapy. Great credit is due the surgeons who have been able to relieve the meconium obstruction by surgical measures in the first few days of life in over 50% of the patients with this condition in the past three years.

SUMMARY AND CONCLUSIONS

1. An evaluation of terramycin in the management of 49 patients with pancreatic fibrosis is presented. Thirteen patients (group A) received no previous antibiotic therapy. The remaining 36 (groups B and C) had received aureomycin and other antibiotic and chemotherapeutic agents for varying lengths of time.

2. Each of the 13 patients in group A had an excellent response as judged by the improvement in pulmonary symptoms, well-being, and nutritional status. Of the other 36 patients in groups B and C, all but 5 responded favorably. No serious untoward reaction to terramycin was encountered. Clinical relapse usually occurred when the antibiotic was discontinued.

3. The effectiveness of terramycin is compared with that of aureomycin in the management of pancreatic fibrosis in 36 patients. It is concluded that the two drugs are equally efficacious. In seven patients aureomycin seemed to be more effective than terramycin, and in seven patients terramycin seemed more effective than aureomycin. In the remaining 22 patients both drugs were alike in their effect.

4. Terramycin is effective in the management of pancreatic fibrosis when administered in small doses of from 7 to 30 mg. per kilogram of body weight on a daily basis. Early diagnosis and prolonged therapy results in the most favorable clinical response. Suggestions for the management of refractory cases are made by the use of combinations of antibiotics and the rotation of these agents.

5. The importance of other measures that have been mentioned in the management of patients with this disease should not be neglected. Indiscriminate use of antibiotics without proper control and frequent observations should be discouraged. The employment of adjunct measures, such as dietary control, good nursing care, personal hygiene, and the use of expectorants, should be part of the provision of complete medical care for each patient.

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Perforated Peptic Ulcer.—In evaluating the methods of therapy for a complex clinical problem, such as an acute perforated peptic ulcer, the important consideration is not whether one therapy should be employed to the exclusion of another but rather wherein each may conceivably be used with the greatest advantage. . . . At present, we are disposed to favor surgical exploration and the use of simple suture in all early acute perforations, whether the diagnosis is suspected or definitively proved, unless the condition of the patient contraindicates a laparotomy or the use of an anesthetic. Likewise, if a case is seen after a lapse of 12 to 24 hours without convincing clinical signs of localization, we still prefer this approach providing no operative contraindication exists. If the clinical evidence in such delayed cases indicates a definite spontaneous containment of the effects of perforation, we are prepared to entertain the use of the nonoperative method. Our decision, to a large degree, would be determined by the condition of the patient. Finally, we are prepared to modify our preference for the use of simple suture in acute perforations which occur within or adjacent to chronic calloused penetrating ulcer, particularly at the site of the reentrant angle of the stomach. In such cases, in which closure may prove difficult or uncertain, a partial gastrectomy may be justifiable providing the condition of the patient is favorable and the experience of the surgeon is adequate.—Sigmund Mage, M.D., and Benjamin A. Payson, M.D., A Consideration of the Present Status of Simple Suture in the Treatment of Acute Perforated Gastroduodenal Ulceration, *Surgery, Gynecology and Obstetrics*, May, 1952.

ELECTROCARDIOGRAPHIC PATTERNS IN PATIENTS WITH SECOND MYOCARDIAL INFARCTIONS

STUDIES OF TWELVE PATIENTS WITH ANTERIOR MYOCARDIAL INFARCTION FOLLOWED BY POSTERIOR MYOCARDIAL INFARCTION

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The electrocardiographic patterns of acute myocardial infarctions are a matter of common knowledge, and the serial changes have been documented by a number of authors. Less attention, however, has been directed to the serial changes due to second infarctions, which are the subject of this study. This report is limited to cases in which an original infarction of the anterior type is followed at a later date by a second of the posterior type.

REVIEW OF THE LITERATURE

On this subject, the earliest pertinent reference we were able to find was that of Levine and Brown [1] in 1929. They reported a series of 46 cases of coronary thrombosis; 6 of these showed both "old and recent lesions." Of these six, one (case 19) showed an electrocardiographic pattern of the anterior type in 1922 and a posterior type pattern five months later.

Four years later, Wood, Bellet, McMillan, and Wolferth [2] said: "Electrocardiographic characteristics of an acute infarct may be altered by changes in the QRS complex caused by previous infarction. . . . Of 36 cases of acute coronary thromboses reported three had electrocardiographic evidences of previous infarction." A second report by Wolferth and Wood,[3] in 1935, stated that the patient "may have had a previous cardiac infarct. However, in our experience this has not prevented the localization of the recent lesion."

Barnes,[4] in 1935, wrote as follows:

> The presence of multiple infarction confuses the analysis of the resulting electrocardiographic changes, and in the final interpretation of such cases all possible infarcts must be sought for and their age sequence determined, if possible, by microscopic study. . . . The presence of a large healed infarct of the anterior portion of the heart may lead the examiner to overlook less obvious, but more recent infarct in the posterior base of the left ventricle; this happened in a case recently reported and led to the serious question of the hypothesis of localization. Moreover, it must be borne in mind that the more recent infarct dominates the RST changes in the electrocardiogram.

Sixteen cases in which an old and a recent infarction occurred as proved by autopsy were reported by Sprague and Orgain.[5] In this group with an old and a fresh coronary occlusion, the occurrence of low voltage and "intraventricular conduction defects" became more prominent in 11 cases, and the "T wave changes characteristic of coronary occlusion" were seen in 9 of the 16 cases.

In a discussion of the value of lead IVF in cardiac infarctions, Burton,[6] in 1945, stated:

> In each of eleven cases in this group electrocardiographic changes gave adequate evidence of two or more separate clinical episodes diagnosed cardiac infarction. It is interesting to note that in two of five cases with evidence of an old anterior infarct upon which had been superimposed a recent posterior infarct the well-marked initial negative deflection of QRS_1 that developed as the result of the anterior infarction, completely disappeared leaving a normal R_1 with the advent of the posterior infarct.

Levy and Hyman [7] recently wrote: "Serial studies of patients with multiple episodes of myocardial infarction will usually enable one to localize the lesion accurately, despite the fact that the final electrocardiogram may show QRS changes of the predominant area of infarction only."

From a textbook standpoint, Graybiel and White [8] (1946) report a case of acute posterior myocardial infarction on an old anterior myocardial infarction. Two electrocardiograms are presented. The authors stated:

> These electrocardiograms show very well, the effect on the record of the superimposition of a fresh posterior myocardial infarct on 2½ year old anterior myocardial infarct, rendering the electrocardiogram more normal in appearance because of the elevation of the T waves in Lead I and in the precordial leads even though the heart is actually more damaged than before, there being now two infarcts instead of one.

Katz [9] said:

> The occurrence of a second acute myocardial infarction is shown in the electrocardiogram by the appearance of the S-T stages. If the new infarct is in the area previously damaged, the record may resemble the type already established, otherwise an opposite or composite form will develop.

White [10] mentioned the subject in his book and specifically said:

> It is of especial interest that evidence of previous myocardial infarction in the limb leads may be more or less neutralized by a new infarct and that the electrocardiogram may actually look

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1. Levine, S. A.: Coronary Thrombosis: Its Various Clinical Features, Medicine **8**: 245 (Sept.) 1929.
2. Wood, F. C.; Bellet, S.; McMillan, T. M., and Wolferth, C. C.: Electrocardiographic Studies of Coronary Occlusion; Further Observations on the Use of Chest Leads, Arch. Int. Med. **52**: 752 (Nov.) 1933.
3. Wolferth, C. C., and Wood, F. C.: Acute Cardiac Infarction Involving Anterior and Posterior Surfaces of the Left Ventricle; Electrocardiographic Characteristics, Arch. Int. Med **56**: 77 (July) 1935.
4. Barnes, A. R.: Electrocardiogram in Myocardial Infarction; Review of 107 Clinical Cases and 108 Cases Proved at Necropsy, Arch. Int. Med. **55**: 457 (March) 1935.
5. Sprague, H. B., and Orgain, E. S.: Electrocardiographic Study of Cases of Coronary Occlusion Proved at Autopsy at the Massachusetts General Hospital, 1914-1934, New England J. Med. **212**: 903 (May) 1935.
6. Burton, C. R.: The Value of Lead IVF in Cardiac Infarction, Am. Heart J. **30**: 259 (Sept.) 1945.
7. Levy, L., II, and Hyman, A. L.: Difficulties in the Electrocardiographic Diagnosis of Myocardial Infarction, Am. Heart J. **39**: 243 (Feb.) 1950.
8. Graybiel, A.; White, P. D.; Wheeler, L., and Williams, C.: Electrocardiography in Practice, ed. 2, Philadelphia, W. B. Saunders Company, 1946, p. 202.
9. Katz, L. N.: Electrocardiography Including an Atlas of Electrocardiograms, ed. 2, Philadelphia, Lea and Febiger, 1946, p. 284.
10. White, P. D.: Heart Disease, ed. 3, New York, The Macmillan Company, 1948, p. 496.

better when a fresh posterior infarct changes an inverted T wave to an upright position in Lead I, the result of an old infarct; the precordial leads are more discriminating.

With regard to this problem, Friedberg [11] stated: "The electrocardiographic changes produced by the fresh infarct may be neutralized by those of previous infarcts."

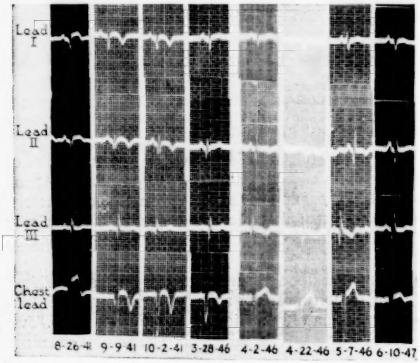

Fig. 1 (case 1).—This series of electrocardiograms was chosen to illustrate the major changes that occurred during the first (anterior) infarction (Aug. 26 to Oct. 2, 1941), the stabilized pattern following this infarction (March 28, 1946), the major changes of the second (posterior) infarction (April 2 to May 7, 1946), and the electrocardiogram revealing residues of both infarctions (June 10, 1947).

He further stated, in regard to "combined anterior and posterior infarction," that "When there is an old infarct on one surface and a fresh infarct on the other the changes due to the recent infarct may be added to or replace those of previous infarctions."

Bellet and McMillan,[12] in discussing "variations of the usual patterns in posterior infarctions," stated: "Where there has been a previous old anterior infarction acute infarction of the posterior wall is characterized by the typical changes enumerated above." (They described patterns in Q and T waves in leads 2 and 3.) "In addition, T_1 may be inverted and there is frequently an absence of the initial upward deflection with some depression of the R-S-T segment, these additional findings being a result of an old anterior infarct."

MATERIAL AND METHOD

For this study the records of 12 patients with two myocardial infarctions were selected; these patients had an anterior infarction followed by a posterior infarction. The standards for diagnosis were those listed in the "Nomenclature and Criteria for Diagnosis of Diseases of the Heart."[13] The points of diagnosis were protracted precordial pain, variable degree of collapse, fall in blood pressure, mild elevation of temperature, leukocytosis, elevation of sedimentation rate, and the conventional serial electrocardiographic changes.

11. Friedberg, C. K.: Diseases of the Heart, Philadelphia, W. B. Saunders Company, 1949, pp. 242 and 450.

12. Bellet, S., and McMillan, T. M.: in Diagnosis and Treatment of Cardiovascular Disease, edited by W. B. Stroud, ed. 4, Philadelphia, F. A. Davis Company, 1950.

13. Nomenclature and Criteria for Diagnosis of Diseases of the Heart, ed. 4, New York, J. J. Little and Ives Company, 1943, p. 38.

The charts selected were those in which there were a substantial number of electrocardiograms available for study, with autopsy records in some.

A characteristic single record reads as follows:

G. A. (case 1 in the accompanying table) was born in 1896. His parents lived beyond their 75th year. A brother died of pneumonia; another brother and two sisters outlived him. He had the usual diseases of childhood. At the age of 43, while working as an executive in a packing plant, he was found to have mild hypertension (150/90). At the age of 45 (Aug. 25, 1941), after his evening meal he experienced a bout of severe anterior chest pain, referred into the neck and left arm and lasting 15 minutes. He continued to have pain of similar character throughout the night, with episodes of increased severity. He perspired profusely and was apprehensive.

The following day, he was admitted to Passavant Memorial Hospital, where he remained for six weeks. His temperature for the first eight days ranged from 36.7 to 38.9 C (98 to 101 F). His pulse rate varied from 80 to 120 beats per minute, and his blood pressure varied between 98/64 and 138/80 mm. of mercury. The white blood cell count ranged from 14,000 to 6,500 per cubic millimeter. The Kahn reaction was negative, and the urine was normal. The electrocardiograms taken during this hospital stay showed the conventional changes of an acute myocardial infarction of the anterior type. He returned to work Dec. 1, after a disability of three and one-half months. Between the ages of 46 and 49 (1942 to 1945), his course was uneventful. His blood pressure varied from 120/86 to 140/90.

In his 50th year, on March 28, 1946, after a month's vacation in Cuba, he had recurrent attacks of chest pain and fatigue. An electrocardiogram on April 2 showed distinct changes, and he was again hospitalized at the Passavant Memorial Hospital, where he remained for six weeks. During this stay, his temperature ranged between 36.2 C and 37.4 C (97.2 and 99.3 F). His pulse rate ranged between 70 and 110 beats per minute, and his blood pressure varied between 118/70 and 170/100 mm. of mercury.

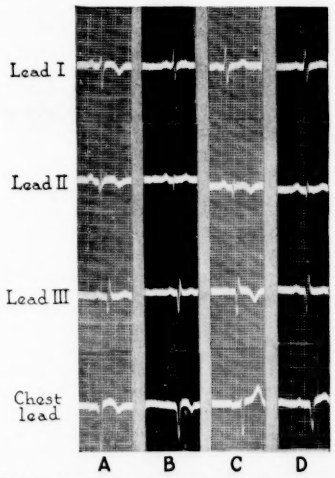

Fig. 2.—This shows a condensation of the serial electrocardiograms in case 9 (see the accompanying table). These tracings illustrate the fully developed anterior pattern (*A*), the residual anterior pattern (*B*), the fully developed posterior pattern that obliterates the residues of the original (anterior) infarction (*C*), and, finally, the residuals of both infarctions (*D*). This typifies the major sequential electrocardiographic changes that are found to occur in our study.

The white blood cell count ranged between 8,900 and 6,900. Again the Kahn reaction was negative and the urine normal. The sedimentation of the red blood cells ranged between 30 and

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15 mm. in one hour (Wintrobe). Electrocardiograms taken during this episode showed the T wave changes of a posterior wall myocardial infarction.

The patient returned to work in August, 1946. When he was 51 (1947), an allergic dermatitis of the hands developed. In July, 1949, at the age of 53, an unexplained temperature rise occurred and he was hospitalized at the Madison General Hospital. Gradually evidence of cardiac insufficiency with edema developed. Extensive roentgenologic and laboratory studies failed to clarify the cause of his febrile illness. Aureomycin and penicillin therapy had no effect, and sulfadiazine was given with seemingly favorable results. The edema was treated with digitalis and mercurial diuretics, with only fair success.

On Sept. 8, the patient died suddenly, and autopsy was performed by Dr. P. L. Gausewitz.[14] The heart, which weighed 500 gm. and had essentially normal valves, showed occlusion of the left descending coronary artery by an old thrombus. Distad to this point and mediad to the apex of the left ventricle, there was a cardiac aneurysm, 7 by 6 cm., with calcification of the pericardium over this area (the first infarction).

The left circumflex coronary artery was markedly arteriosclerotic, with hyalinization of the wall and containing a hyalinized calcified thrombus that had been recanalized. There was extensive connective tissue replacement of the myocardium in this area. The right circumflex artery was almost completely occluded at 7 cm. from its origin by what appeared to be old atheromatous lesions (the second infarction).

In the region of the recanalized calcified thrombus, there was a hemorrhage into the wall of the vessel, which had "apparently forced the thrombus out so that it almost occluded the lumen." In this area, there was an acute pericarditis with infiltration of polymorphonuclear leukocytes with acute degenerative changes of the myocardial fibers (the third infarction).

In summary, this case record (substantiated by autopsy) presents the clinical, laboratory, and serial electrocardiographic evidence (fig. 1) of consecutive myocardial infarctions—an anterior followed by a posterior infarction and then, as might be expected, the third infarction, which caused death.

The clinical and laboratory records of the other 11 patients were as comprehensive as the case history presented above. Certain variations appeared, such as the time interval between the first and second infarctions. The minimal time was six weeks and the maximum six years. The clinical course of each patient was modified to some extent by coexisting diseases such as hypertension, peptic ulcer, cholelithiasis, trauma, and a variety of infections. Tabulation of pertinent details of the records in 12 cases of anterior infarction followed by posterior infarction is presented in the accompanying table.

The electrocardiographic records routinely consisted of the three standard limb leads. Tracings from 1937 to 1946 included also a single chest lead, usually CF_4. From 1946 to 1951, the chest leads were routinely CF_2, CF_4, and CF_5, or V_2, V_4, and V_5.

Data in Twelve Cases of Anterior Infarction Followed by Posterior Infarction

Case No.	Age at Time of Infarction, Yr.		Approximate Time Interval Between Infarctions	Other Diseases	Status of Patient at Time of Report	Postmortem Observations (Heart)
	Anterior	Posterior				
1	45	50	4½ yr.	Allergic dermatitis; fever of unknown origin	Dead (third infarction)	Old anterior infarction with cardiac aneurysm; old and recent posterior infarction
2	45	51	6 yr.	Fracture of elbow and femur	Dead (second infarction)	Old anterior infarction involving septum; recent posterior infarction with myocardial rupture; recanalized thrombus right coronary artery
3	54	57	3 yr.	Hypertension; arthritis	Living	.....
4	37	38	1 yr.	Alcoholism	Dead (chronic cardiac insufficiency)	Autopsy not made
5	51	54	3 yr.	Hypertension; hemorrhoids; prostatism	Dead (third infarction)	Autopsy not made
6	56	56	6 wk.	Thrombophlebitis	Dead (second infarction)	Autopsy not made
7	57	61	4 yr.	Duodenal ulcer; diverticula of colon; Neisseria gonorrhoeae infection; hypertension	Dead (third infarction)	Autopsy not made
8	47	48	1 yr.	Alcoholism; gallstones; iritis	Dead (third infarction)	Old anterior infarction; old posterior infarction; recent anterior infarction
9	52	54	2 yr.	Psoriasis; obesity; arthritis; hypertension	Living	.....
10	57	57	6 mo.	Hypertension	Living	.....
11	47	52	5 yr.	Duodenal ulcer; pneumonitis	Dead (cardiac insufficiency)	Autopsy not made
12	57	58	1 yr.	Duodenal ulcer; gallstones; hypertension	Living	.....

Three of the 12 patients had had electrocardiograms taken prior to the first infarction. The majority of the patients had a few tracings during the first 10 days after the acute episode, and at 7 to 10 day intervals while in the hospital. Between the first and second infarctions, tracings were made at intervals, from one to four per year. During the posterior infarction, the schedule followed was similar to that used during the first infarction. Those who survived had tracings made at variable intervals.

RESULTS

Review of the electrocardiographic records concerned with the primary anterior infarction showed the conventional serial defects. The T waves of lead 1 were typically inverted. There were less definitive changes in

14. Personal communication to the authors.

lead 2. Inversion of the T waves occurred in one or more of the precordial leads. There were elevations of the RS-T segments recorded in 6 of the cases, and coving was evident in 11. In 10 of the group, a demonstrable Q wave was present in lead 1, lead 2, or a precordial lead.

A residual pattern of the first infarction was usually established in the interval of weeks, months, or years between the original, anterior, infarction and the second, posterior, infarction. The T wave in lead 1 remained inverted in five cases, blunt or isoelectric in three cases, and definitely upright in four cases. In the precordial leads, the T wave remained persistently inverted in one or more leads in seven cases. There were slight elevations in the RS-T segments in 7 of the 12 records in the limb and/or the precordial leads. The Q waves of the limb leads or the precordial leads noted during the acute stage did not change significantly in the residual patterns.

With the advent of the second infarction (posterior), conventional serial changes were evident. Most obvious and consistent was the inversion of the T wave in lead 3 in all cases. In the eight cases in which there were residual T wave defects in lead 1, the T wave became definitely upright within from one to four days. Coincident with the inversion of the T wave in lead 3 and the rise of the T wave in lead 1, the T waves of the precordial leads assumed an upright position. In five cases there was definite elevation of the RS-T segments in lead 3, and in three cases some elevation of these segments in lead 2. In two cases the RS-T segment in lead 1 showed some depression, and in no case was there a depression of this segment in any precordial lead. Contrary to expectation, in nine cases there was a slight elevation of the RS-T segments in a precordial lead. In no record was there any significant Q wave alteration that existed as a residual of the old anterior infarction.

Six patients survived for at least one year after the second infarction. Three of these had electrocardiographic patterns apparently the result of both infarctions, two had patterns of the posterior infarction only, and one had an essentially normal pattern.

COMMENT

The primary problem of this study is concerned with the diagnosis of a posterior myocardial infarction following an anterior myocardial infarction. There is a possibility that we have missed documenting an infarction before or during the time the patient was under observation. We believe, however, that our clinical records are accurate, and in three cases (see accompanying table) pathological verification was secured.

Electrocardiographically it is evident from our data that a posterior myocardial infarction superimposed on an old anterior myocardial infarction results in expected pattern changes. Old anterior residual defects, particularly T wave inversions in lead 1 and/or precordial leads, show substantial and prompt obliteration (fig. 2). Q waves in limb or precordial leads, however, were not significantly altered. In some patients the residual of the old anterior infarction reappeared after a few months, and in some the newer posterior pattern predominated. In one record, after 14 months, neither old nor recent infarction was evident.

In previous reports, Barnes,[4] in 1935, appears to have been the first to appreciate clearly, in any given patient presenting symptoms and electrocardiographic evidence of myocardial infarction, the importance of a previous infarct. He also recognized that the primary infarction "confuses the analysis" of the resulting electrocardiographic changes of the second infarct and that the more recent infarct "dominates the RS-T changes."

Other authors appear to have had a more casual interest in the second infarction. Of those who mention the subject, in discussions of the electrocardiographic diagnosis of myocardial infarction, Wood and co-workers,[2] Sprague and Orgain,[5] and Levy and Hyman [7] were interested in the QRS changes, and Katz,[9] in the S-T segments. Sprague and Orgain,[5] Graybiel and co-workers,[8] Friedberg,[11] and Bellet and McMillan [12] spoke of the T wave changes. We would be inclined to emphasize the entirety of the QRS-T pattern changes and the progression of the changes in serial tracings. As the second infarct is reflected in the electrocardiographic picture, the defects of the old infarct are substantially obliterated.

The statement of White [10] that the "electrocardiogram may actually look better when a fresh posterior infarct changes an inverted T wave to an upright position in Lead I" must be qualified. Serially, as the T wave in lead 1 becomes upright, the T waves in lead 3 and possibly in lead 2 are inverting (also Q waves in leads 2 and 3 may appear), all of which are significantly abnormal.

The reappearance of the R wave in lead IVF in two cases with the advent of the posterior occlusion, as reported by Burton,[6] was not evident in our chest leads.

Completion of this electrocardiographic study of the simple combination of an anterior infarction followed by a posterior infarction indicates that further work is necessary. It would be desirable to review a greater number of case records, substantiated by postmortem findings, to corroborate or modify our conclusions. We hope to present further information at our command, dealing with other combinations of two myocardial infarctions: the converse of the present one, a posterior followed by an anterior infarction; or two sequential anteriors; or two sequential posteriors; or others. The ultimate step, obviously, is the sequence of three or more myocardial infarctions.

CONCLUSIONS

1. The clinical and electrocardiographic records of 12 patients who had sustained two myocardial infarctions —first an anterior type, followed later by a posterior type —were studied with reference to the electrocardiographic changes resulting from the second infarction.

2. A second infarction (posterior) engrafted on a first infarction (anterior) presents typical electrocardiographic changes in the serial tracings, similar to those conventionally recorded.

3. The residual electrocardiographic pattern of the anterior infarction is substantially obliterated from the electrocardiographic records by the acute changes of the posterior infarction.

4. Months or years after the second infarction, the electrocardiographic pattern may be that of the posterior (second) infarction, a mixture of defects that are the residual of both infarctions, or a nearly normal pattern.

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MEASUREMENT OF BODY WATER

TECHNIQUES AND PRACTICAL IMPLICATIONS

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A satisfactory method for the measurement of total body water in the living subject has long been sought. This is not surprising when one pauses to consider the overwhelming importance of water in the body economy. Water furnishes the preponderant single molecular element in the fabrication of tissue. Its presence is essential to the great mass of chemical reactions on which life depends. It furnishes the means of transport of virtually all enzymes, substrates, metabolites, gases, electrolytes, antibodies, and other substances that must be moved to and from the cell. Cellular function itself is affected by abnormal fluctuations in water content.

The methods that have been employed for the measurement of total body water may be considered under three general headings: desiccation procedures, body specific gravity measurements, and dilution techniques.

DESICCATION

The first estimates of body water content were accomplished with desiccation procedures. One of the early studies in man was reported by Bischoff [1] in 1863. He obtained a value equal to 58.5% of the body weight of the cadaver. More recently, Mitchell and his associates [2] have reported a value of 67.85% in a patient who died in congestive heart failure, and Iob and Swanson [3] have recorded a value of 75% in a stillborn infant. However, valuable as are the data obtained by this method, it is obviously not one that can be employed clinically.

BODY SPECIFIC GRAVITY

In 1941 Behnke [4] reported his studies dealing with specific gravity measurements in young men. He showed that in normal subjects the determination of body specific gravity enabled one to estimate the body fat content. Fat, with its low specific gravity of 0.92, was identified as the primary variable that determined body density. From these findings Behnke formulated his now widely accepted concept of the lean body mass. He conceived of the body as consisting of a fat-free portion of essentially constant gross composition and of a variable quantity of fat. He was not at that time primarily interested in determining values for total body water in his subjects, but he might easily have done so, for body water and body fat bear a reciprocal relationship to each other [5]; that is, the less the fat content, the greater is the percentage of water contained in the body. The specific gravity method of estimating body fat content (and body water) has since been amply confirmed.[6]

DILUTION METHODS

A number of substances have been employed in the search for an ideal material, which when introduced into the body would allow the safe and accurate measurement of total body water. Such a substance should not be toxic to the organism. It should equilibrate rapidly with body water. It should not be selectively stored or excreted, and it should not be metabolized. Its concentration in urine or plasma should lend itself to ready measurement. Among the substances that have been used for this purpose are potassium,[7] thiourea,[8] sulfanilamide,[9] tritium (the radioactive isotope of hydrogen, mass 3),[10] antipyrine,[11] and deuterium oxide (heavy water).[12] For various reasons, the first three of these substances are unsatisfactory. Values for body water obtained with tritium agree well with those obtained with specific gravity measurements,[10] but the long half-life of this radioisotope renders its use in human beings potentially hazardous. In addition, its triple mass raises the question of whether its kinetics of distribution are identical with those of ordinary hydrogen, especially since there is evidence that even deuterium (mass 2) behaves differently in high concentrations.[13] Antipyrine and deuterium oxide are currently regarded with a considerable degree of confidence, and they will be considered in some detail.

Antipyrine was first introduced for this purpose by Soberman and his associates in 1949.[14] These observers demonstrated that after injection it was distributed uniformly throughout the body water and that its concentration in body fluids could be determined accurately with the spectrophotometer. They also showed that the values for body water obtained with antipyrine agree closely with those obtained with deuterium oxide (heavy water). Messinger and Steele,[15] and Osserman and coworkers [6b] compared values for body water obtained with the use of antipyrine with those obtained from specific gravity measurements in the same subjects and found a satisfactory correlation between the two sets of

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values. Nevertheless, there are certain disadvantages inherent in the use of antipyrine: It equilibrates slowly with abnormal fluid deposits, such as ascites; it is selectively bound by protein; and it is metabolized at a rate which varies between subjects. Even so, by employment of suitable corrections an estimate of body water can be made.

Deuterium oxide (heavy water) was first used for the determination of body water by von Hevesy and Hofer, in 1934.[12a,b] It should prove an ideal tracer for water. There is no evidence that it is chemically identifiable by the body tissues, the heavy hydrogen equilibrates rapidly with body water, it is not selectively stored or excreted, and in the amounts used it is not toxic to the organism. Moore [12c] introduced its use in the United States in 1946. He and others [16] have shown in desiccation studies that the volume of dilution of deuterium oxide corresponds closely to the total body water.

The measurement of total body water with deuterium oxide is accomplished as follows. A measured quantity of the isotope (usually 25 to 50 gm. of 99.8% deuterium oxide diluted to 100 ml. with 0.85% sodium chloride solution) is injected intravenously, a minimum of one and a half hours is allowed for equilibration of the deuterium with body water, and a blood specimen is then drawn for analysis. The plasma water is first purified by appropriate distillation, and the distillate is then analyzed for deuterium concentration by an elaborate falling drop technique.[17] This method for the determination of deuterium concentration, accurate under optimal conditions to from one to two parts per million, consists of three essentially separate components. The first is an extremely sensitive thermoregulator that maintains the temperature of the water bath to within approximately 0.001 C. The second is an elaborate pipet mechanism that delivers a drop of constant size. The third is a distillation process that achieves a very high degree of purification of plasma water.

INFORMATION DERIVED FROM BODY WATER MEASUREMENTS

Body Water and Body Fat.—At the time his studies establishing the relationship between body specific gravity and body fat were reported, Behnke proposed, on a theoretical basis, that body water and body fat must bear an inverse relationship to each other. To test this concept, we [12d] selected a group of healthy adult male and female human subjects ranging in size from the very lean to the very obese. Heavy water was injected intravenously and, after equilibration with the body water, the concentration of deuterium oxide in the water distilled from plasma samples was measured by means of the accurate specific gravity method described above. The leanest male subject had a total body water value of 71% of body weight (44.5 liters), and the most obese male subject had a total body water value of 42% (48.3 liters). Similarly, the leanest female subject had a total body water value of 68% and the most obese female subject a body water value of 50%. However, the most obese female subject was not clinically as obese as the most obese male subject. In general, the values for percentage body water of female subjects appeared to be somewhat lower than those for male subjects of corresponding weight and habitus. The average value for body water for eight healthy men was 60% of body weight. The subjects who individually had values in the neighborhood of 60% were merely of good nutrition, being neither skinny nor fat.

Other workers have reported somewhat different values for body water. Using antipyrine, Soberman and his associates [14] obtained values for body water in normal subjects ranging from 43% to 58%, and these findings agreed well with those afforded by deuterium and specific gravity measurements. It is not clear whether an attempt was made to select subjects with a wide range of body weight and habitus. In a more recent study, Osserman and his co-workers compared the body specific gravity and antipyrine methods in a group of healthy young men of increasing degrees of obesity. They found that the body water ranged from 43% in the most obese to 72% in the leanest, and these values compare very favorably with those obtained by us (42% and 71%, respectively). These workers found, also, that the value for total body water was almost constantly 71% of the lean body mass. Schloerb and his associates [18] have reported an average value of 61.8% for body water in healthy young adult men and 51.9% in healthy young adult women. Again, these findings correspond very closely with the average of 60% in males and 55% in females found by us. It therefore becomes necessary to revise our concepts concerning the average percentage value for the body water content in healthy adults. The commonly used value of 70% is acceptable only in the unusually lean subject.

The concept of the lean body mass may prove useful clinically. Schloerb and his co-workers [18] found the total body water to be more closely correlated with surface area and oxygen consumption than with the other physical indexes examined. While it would be erroneous to assume that fat is metabolically inactive, it is probable that the lean body mass is metabolically more active. Thus, if the lean body mass can be used as a basis for a comparison of the metabolic activity of different subjects, it may be possible to adjust certain hitherto perplexing "discrepancies" in basal metabolic rates. Projecting this line of thought further into the clinical field, it would seem more reasonable to calculate dosages of drugs on the basis of the lean body mass than on body

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weight, as is now so frequently done. The markedly obese patient should not receive powerful drugs on a dosage schedule based purely on body weight. It would be preferable to employ some such convention as the "ideal" body weight.

BODY FLUID COMPARTMENTS

Hardy, Sen, and Drabkin [19] have examined the relationships of total body water, "extracellular" fluid, and plasma volume in eight healthy male subjects selected to cover a wide range of body fat content. Levitt and Gaudino,[20] Steele,[5] and Schloerb and his associates [18] have also examined these body fluid compartments. Although numerous materials have been employed to measure the "extracellular" fluid by the dilution method (among them thiocyanate, bromide, sodium, chloride, and inulin) only sodium thiocyanate and inulin have had wide use. Inulin is generally accepted as perhaps the most reliable substance thus far used for this purpose. It yields values for extracellular fluid in the neighborhood of 15% of body weight.[5] However, the analytical procedures involved in the use of this material render it impractical for general use. The use of sodium thiocyanate,[21] on the other hand, while subject to certain objections, has the solid merit of being readily available and its analysis in body fluids is a simple precedure. Thus, it is easily applicable clinically. The chief disadvantage of using sodium thiocyanate is that a fraction of the thiocyanate ion unquestionably enters the cells in normal subjects, and in certain pathological states this intracellular fraction may be very large.[22] Obviously, any appreciable loss of thiocyanate ion into the cells will result in a value for the extracellular fluid that is erroneously high. Nevertheless, for practical reasons we have employed sodium thiocyanate to estimate the extracellular fluid in normal subjects.[19] Thiocyanate space was found to be more closely correlated with body water than with body weight. Two very lean male subjects both had "extracellular" fluid values of 22% of actual body weight and 32% of total body water. These two subjects had total body water values of 69% and 71%, respectively, of body weight. The most obese male subject, on the other hand, had a thiocyanate space that was only 16% of the body weight but was 38% of the body water. The body water was only 42% of the body weight. Thus, the thiocyanate space represented a greater fraction of the total body water in the obese than in the very lean subjects. The explanation for this is not apparent. We know of no evidence that equilibration of sodium thiocyanate is less complete in the obese than in the lean subject. The possibility of a greater penetration of the fat cells by the thiocyanate ion was considered. Neutral fat within other cells of the body in the obese person might conceivably displace cellular water and thus augment the relative size of the extracellular volume. Finally, the space between the fat cells themselves would be available for extracellular fluid. More quantitative information concerning the "extracellular" fluid would be of substantial aid in estimating fluid replacement in states of dehydration, particularly since this fluid compartment is more rapidly depleted in disease states than is the intracellular fluid.

To preserve an open mind, it is important to think of the fluid compartments as physiological rather than anatomic entities. The use of radioisotopes has greatly altered previous concepts concerning the permeability of the cell membrane to certain electrolytes, particularly sodium, potassium, and chloride. It is now realized that these ions can, under appropriate physiological conditions, cross the cell membrane readily.

Plasma volume has been studied more intensively than has any other body fluid compartment. Yet, a dependable clinical guide for estimation of what the normal plasma volume of a given subject should be is still not available. Because of the unacceptability of values obtained for the plasma volume of normal persons when body weight was used as the basis for calculating this value, a study [18] was made of the correlation between plasma volume and total body water in a group of healthy adult men of widely different degrees of obesity. Plasma volume ranged from 2.75% (in the very fat) to 5.65% (in the very lean) of body weight, with a mean of 4.24% and an average deviation of 22%. Expressed as a percentage of total body water, however, plasma volume ranged from 6.2% in the most obese to 7.8% in the leanest, with a mean of 6.96% and an average deviation of 7%. Thus, plasma volume would appear to be more closely correlated with body water than with body weight.

DYNAMICS OF WATER FUNCTION

The measurement of body fluid compartments has been only one of the avenues of research opened by the availability of a satisfactory tracer element for water. Such studies may be characterized as "static" in nature. There are other types of investigation that are aimed at illuminating "dynamic" or "kinetic" aspects of water metabolism. As an example, one may cite determinations of the half-time or biologic half-life of a molecule of water in the body. By administering deuterium oxide orally and measuring rates of urinary excretion, von Hevesy and Hofer [12a] estimated that the length of time the average molecule of water remained in the body of their subject was approximately nine days. In a single subject, one of us (J. D. H.)[23] found this period to be 11 days, and in a number of subjects Schloerb and his co-workers [18] arrived at an average figure of 9.3 plus or minus 1.5 days. Clearly, however, this figure must necessarily be influenced by rates of water ingestion and excretion; that is, the more rapid the water turnover in the body, the shorter is the time the average molecule of water will remain in the body. Accordingly, one would expect the half-times to be different in warm and cold climates and to be abnormal in patients with febrile illnesses, uncontrolled diabetes mellitus, and thyrotoxicosis.

Body Weight Changes in Surgical Patients.—Even momentary reflection suggests that the rapid weight loss

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that follows many surgical procedures must often represent simple water and salt excretion. One of us (J. D. H.) has recently studied a patient who was admitted to the hospital in a state of extreme weakness and emaciation whose diagnosis was that of simple esophageal diverticulum with severe dysphagia.[24] Before treatment was begun her weight was 69 lb. (31.3 kg.) and her body water value was 22 liters. She was then tube fed for 17 days. During this time her general condition and appearance improved enormously, and her weight increased to 86 lb. (39 kg.). Immediately prior to successful surgery, her body water was again determined with deuterium oxide and was found to be 29 liters. Thus, despite the fact that clinical edema was not manifest, her weight gain consisted very largely of water. This single example is cited to indicate the relatively large variations in body water content that may escape clinical detection.

Heart Failure.—Rates of water mobilization and distribution in cardiac decompensation offer a fertile field for investigation. In such patients the normal relationships between percentage body water and body weight do not hold. For example, we have determined the body water of frankly edematous patients and found their percentage of body water no greater than that in healthy lean subjects. The explanation of this lies, of course, in the fact that these patients were somewhat obese. If some simple means of determining their body fat content were available it would be found that their percentage of body water was appreciably greater than 71% of the lean body mass.

Other Factors That May Be Examined with Deuterium Oxide.—Rates of spinal fluid formation may be studied with the use of heavy water as a tracer. Fluid kinetics in thermal burns and shock represent one of the most important factors associated with the management of these injuries, and several surgical clinics are actively investigating these problems. The relationships between the blood supply of the bowel and the movement of water and electrolytes across its cellular membranes will surely be subjected to a more quantitative scrutiny than has been possible in the past.

SUMMARY

The several types of measurements that may be employed for the determination of total body water are outlined. The use of dilution methods has made available valuable information concerning the relation of body fluid compartments to body fat and to each other. Deuterium oxide (heavy water) appears to be an excellent tracer substance for water, and its availability has made possible a more critical examination of rates of water turnover in the body and rates of transfer of water across various cell membranes. It is reasonable to anticipate that our knowledge of body fluid compartments and of water kinetics in the human body will be enormously extended by the use of isotopes.

24. Hardy, J. D.: Unpublished data.

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INCREASED INTRACRANIAL PRESSURE IN EMPHYSEMA CAUSED BY OXYGEN INHALATION

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Respiratory depression followed by delirium and coma has developed in several patients with chronic pulmonary emphysema while they were receiving oxygen therapy in this hospital. I have studied some of these patients as well as some normal subjects in an effort to determine the mechanism of production of this phenomenon.

Three normal subjects and four patients with chronic lung disease were studied. Their ages and diagnoses are listed in table 1. Brief summaries of the clinical states of the four diseased patients are given below.

PROCEDURE

The subject lay on his left side, and an indwelling needle was placed in the brachial artery. A lumbar puncture needle was inserted, connecting the subarachnoid space to a spinal fluid monometer. The subject breathed through a rubber mouth piece attached to a three-way valve by which connection could be made either to a 9L spirometer containing 100% oxygen or to room air. During an initial period of rest and room air breathing, basal spinal fluid pressure readings were obtained. The mouth piece valve was then turned to connect the subject to the spirometer that contained 100% oxygen, and a soda lime-carbon dioxide absorber. An attached kymograph recorded the respiratory excursions. Spinal fluid pressures were recorded every 30 seconds throughout all procedures. When the effect of oxygen inhalation had been observed, the valve was again turned to give the subject access to room air. The carbon dioxide absorber was then removed from the spirometer and the tank refilled with 100% oxygen. When the valve was again turned, the subject was made to rebreathe oxygen from the spirometer, which, lacking a carbon dioxide absorber, came gradually to contain increasing tensions of carbon dioxide. The spirometer gas was analyzed [1] at the end of rebreathing and found in all the carbon dioxide experiments to contain 6 to 8 vol.% of carbon dioxide. At appropriate intervals throughout the procedures, arterial blood samples were drawn with care being taken to exclude oxygen and stored in ice [2] until they were analyzed for oxygen and carbon dioxide in the Van Slyke manometric apparatus.[3]

From the Cardiac Laboratory, The Mary Imogene Bassett Hospital.

1. Stevens, C. D., and others: Oxygen-Absorbing Solution for the Scholander Quick Gas Analyzer, Indust. & Engin. Chem. (Analytical Edition) **17**: 598, 1945.

2. Comroe, J. H., Jr.: Methods in Medical Research, Chicago, The Year Book Publishers, Inc., 1950, vol. 2, p. 138.

3. Peters, J. P., and Van Slyke, D. D.: Quantitative Clinical Chemistry Methods, Baltimore, Williams & Wilkins Company, 1932.

RESULTS

Ventilation (Table 2).—During oxygen inhalation the three normal subjects had an average increase in respiratory volume of 15% and a 16% increase in tidal volume. This slight increase in ventilation produced by oxygen in normal subjects is consistent with the findings of others.[4] Patients L. K. and J. W. showed slight increase in minute volume during oxygen inhalation, while the tidal volume of one decreased and that of the other increased slightly. There was no significant change in the carbon dioxide content of their arterial blood, which initially had been normal. Both subjects appeared to be consciously controlling their respirations during the procedure.

Patients J. H. and K. B. showed a prompt decrease in both minute volume and tidal volume during oxygen inhalation. The change in minute volume was less than the decrease in tidal volume, owing to a slight increase

TABLE 1.—*Data in Cases Studied*

Subject (Sex)	Age, Yr.	Diagnosis
Normal 1 (F)	18	Convalescent from poliomyelitis; heart and lungs normal
Normal 2 (F)	64	Convalescent from cerebrovascular accident; heart and lungs normal
Normal 3 (M)	32	Convalescent from poliomyelitis; heart and lungs normal
Patient J. H. (F)	55	Cor pulmonale secondary to pulmonary fibrosis and emphysema
Patient K. B. (F)	65	Chronic obstructive emphysema secondary to bronchial asthma
Patient L. K. (M)	70	Chronic obstructive emphysema secondary to bronchial asthma
Patient J. W. (M)	71	Chronic obstructive emphysema secondary to bronchial asthma

TABLE 2.—*Effect of 100% Oxygen Inhalation on the Respiration of Normal Subjects and Patients with Chronic Lung Disease*

	Minute Vol. (Cc.) During First Minute	Minute Vol. (Cc.) at Time of Maximum Change	Change in Minute Vol., %	Tidal Vol. (Cc.) First Minute	Tidal Vol. (Cc.)	Change in Tidal Vol., %
Normal 1	4,500	5,000 (3 min.)	+11	300	340 (3 min.)	+13
Normal 2	5,000	5,700 (5 min.)	+14	240	265 (5 min.)	+10
Normal 3	6,080	7,260 (7 min.)	+19	380	480 (7 min.)	+26
Patient J. H.	5,000	2,750 (12 min.)	−45	340	170 (12 min.)	−50
Patient K. B.	3,920	3,160 (7 min.)	−19	216	110 (7 min.)	−49
Patient L. K.	10,500	11,000 (6 min.)	+10	585	502 (6 min.)	−14
Patient J. W.	7,500	8,500 (11 min.)	+13	418	439 (11 min.)	+ 5

in respiratory rate. The arterial carbon dioxide content was abnormally high in both subjects initially (58 vol.%). It rose to 65 vol.% in K. B. during oxygen inhalation. A second blood sample was not drawn from J. H.

Spinal Fluid Pressure.—The three normal subjects and patients L. K. and J. W. showed no significant change in spinal fluid pressure during oxygen inhalation (fig. 1).

The other two patients, J. H. and K. B., had, while breathing oxygen, a prompt, steady rise in spinal fluid pressure to over 600 mm. and 500 mm. of water, respectively. Both of these patients had elevated spinal fluid pressures initially and were the subjects in whom respiratory depression occurred, as described above. The spinal fluid pressure slowly began to fall toward its initial level when the oxygen inhalation was stopped in patient J. H. but was elevated again by the inhalation of 6% carbon dioxide. In patient K. B. the high spinal fluid pressure was rapidly reduced to a level below its initial pressure by hyperventilation with 100% oxygen. The patients had no symptoms or change in mental status during the acute elevations in spinal fluid pressure produced in these experiments.

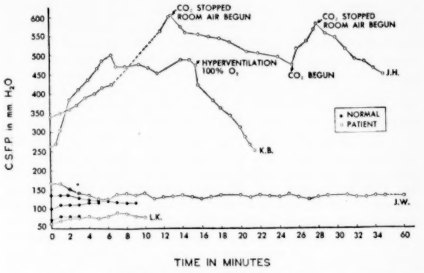

Fig. 1.—Effect of 100% oxygen inhalation on the cerebrospinal fluid pressure of patients with pulmonary emphysema and on normal subjects.

Figure 2 shows the effect of the inhalation of 6% to 8% carbon dioxide on the spinal fluid pressure of the three normal subjects. Carbon dioxide produced a rise in spinal fluid pressure to high levels. The rate of rise in pressure paralleled the accumulation of carbon dioxide in the spirometer during rebreathing. The pressure fell promptly to normal or below when carbon dioxide inhalation was discontinued. Except for an increase in respiratory minute volume, these subjects had no symptoms during these procedures.

REPORT OF CASES

CASE 1.—Patient J. H., a 55-year-old housewife, was admitted to the hospital in 1949, with a history of frequent attacks of bronchial asthma for the previous 22 years. Two years before admission her asthma became more severe, and she began to notice cyanosis and a florid complexion. She had frequent head-

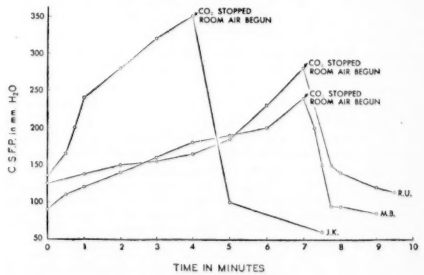

Fig. 2.—Effect of 6% to 8% carbon dioxide inhalation on the cerebrospinal fluid pressure of normal subjects.

aches, dyspnea on exertion, unproductive cough, paroxysmal nocturnal dyspnea, and diminution of vision. Physical examination at that time revealed a moderately cyanotic woman in respiratory distress. There were bilateral papilledema, signs of

4. Dripps, R. D., and Comroe, J. H., Jr.: The Effect of Inhalation of High and Low Oxygen Concentrations on Respiration, Pulse Rate, Ballistocardiogram and Arterial Oxygen Saturation (Oximeter) of Normal Individuals, Am. J. Physiol. **149**: 277, 1947.

pulmonary emphysema, and congestive heart failure, with enlargement of the left ventricle and pulmonary conus seen on x-ray. Her blood pressure was 172/110, hemoglobin 20.6 gm. per 100 cc., red blood cell count 6,590,000, and venous pressure 16 cm. of water.

She was readmitted in October, 1949, at which time her clinical condition was essentially as before. A lumbar puncture showed an initial pressure of 350 mm.; manometric studies were normal. The spinal fluid protein, chloride, and sugar levels were also normal. There was electrocardiographic evidence of right ventricular hypertrophy. Her arterial oxygen saturation was 11.7 vol.% and carbon dioxide content 40 mEq. per liter. She was treated for bronchial asthma and had several phlebotomies.

She was again admitted in October, 1950, because of a severe asthmatic attack. Because of her intense cyanosis, she was given 100% oxygen by nasal catheter shortly after admission. The cyanosis disappeared after a few minutes, but she soon became lethargic and after seven hours of oxygen therapy lapsed into deep coma. Her respirations were shallow. The oxygen therapy was slowly discontinued, and she concomitantly regained consciousness. It was because of this episode that procedures described in this paper were performed.

During the past year this patient has gotten along well on restricted activity and treatment for asthma. The secondary polycythemia has required occasional phlebotomies.

CASE 2.—K. B., a 65-year-old housewife, was admitted to the hospital in November, 1950, with the chief complaint of asthma of 36 years' duration. Her asthma began at the age of 29, after which she had intermittent attacks but was free of symptoms between them. Five months before admission, after an upper respiratory infection, an asthmatic attack started, which continued more or less uninterruptedly and brought about her admission to the hospital.

She presented physical signs of pulmonary emphysema. There were expiratory wheezes heard throughout both lung fields. There was slight cyanosis. Her vital capacity was 850 cc., venous pressure 11 cm. of water, circulation time 24 seconds, hemoglobin 16 gm., red blood cell count 5,890,000, and venous carbon dioxide content 29 mEq. per liter. Fluoroscopic examination of the heart showed generalized enlargement, with abnormally prominent pulmonary vessels. The patient's cerebrospinal fluid pressure response to oxygen inhalation was measured on her eighth hospital day, at which time her asthmatic attack had ended.

CASE 3.—L. K., a 65-year-old retired farmer, was seen in October, 1950, because of a severe asthmatic attack of four days' duration. He had had bronchial asthma for many years. There were physical signs and roentgenographic evidence of obstructive emphysema. His heart was of normal size, and there were no signs of congestive failure. His carbon dioxide content and hemoglobin were normal. He was treated for asthma, after which he became symptom-free, except for exertional dyspnea. The studies reported were done five months later.

CASE 4.—J. W., a 71-year-old retired farmer, was admitted to the hospital for the 11th time in October, 1950, because of a severe asthmatic attack. Bronchial asthma began at the age of 20. In recent years he had had frequent attacks, between which he was incapacitated by pulmonary insufficiency. In addition to physical signs of bronchial asthma and obstructive pulmonary emphysema, he had roentgenographic evidence of numerous large emphysematous blebs arising from the upper lobe of the left lung. There was no cardiac enlargement or signs of congestive failure. Laboratory findings were as follows: hemoglobin 14 gm. per 100 cc., red blood cell count 5,240,000, and carbon dioxide content 46 mEq. per liter. He was treated for asthma and discharged from the hospital. In December, 1950, the studies reported here were performed. He was apprehensive during the procedure and seemed to be voluntarily controlling his respirations.

COMMENT

Undesirable effects of oxygen inhalation in certain patients with pulmonary disease have been reported by others.[5] Barach [5a] described mental confusion and coma occurring in patients with chronic hypoxia when they were given high concentrations of oxygen to breathe. His patients all recovered consciousness, in spite of the continued oxygen therapy. Davies and Mackinnon [5c] described neurological signs, coma, and death with elevation in the spinal fluid pressure during oxygen therapy in certain patients with cor pulmonale. Comroe and coworkers [5e] studied the effects of oxygen on 65 chronically anoxemic patients; mental changes ranging from somnolence to coma occurred in nine. These patients showed diminished ventilatory volume, increased arterial pCO_2, and acidosis during oxygen therapy. Beale and co-workers [5f] reported respiratory acidosis and coma produced by oxygen administered to a patient with asthma but without pulmonary emphysema or fibrosis.

The inhalation of high concentrations of oxygen in normal subjects depresses respiration slightly during the first two minutes; there then follows an increase in minute volume probably owing to the irritant effects of oxygen in high concentration.[4] Table 2 shows the respiratory stimulation that occurred in our normal subjects. An initial depression was not demonstrable, since a preceding spirometric record of room air breathing was lacking.

In two of the subjects with pulmonary emphysema, J. H. and K. B., the 50% decrease in tidal volume during oxygen inhalation is abnormal. It indicates that in these patients anoxia was an important respiratory stimulant, which, acting presumably through the aortic and carotid chemoreceptors, had assumed much of the function of stimulation normally carried by carbon dioxide and the medullary centers. When the anoxic stimulus was removed by oxygen inhalation, respiratory depression ensued in spite of a rising arterial carbon dioxide tension. This is reminiscent of the suppression of carbon dioxide sensitivity of the respiratory centers by barbiturates and consequent respiratory depression produced by oxygen administration in patients poisoned by these drugs.[6]

Patients with chronic pulmonary emphysema are characteristically less sensitive than normal to the respiratory stimulus from carbon dioxide [7] and often have respiratory acidosis from carbon dioxide retention without an increased respiratory rate. This insensitivity of the respiratory centers may be reversible, at least in some cases. This is suggested by Beale's [5f] case of asthma without chronic lung disease and by the fact that Barach's [8] patients did recover from respiratory depression and coma caused by oxygen inhalation in spite of continued oxygen administration. These observations further suggest that carbon dioxide insensitivity may be promoted by anoxia.

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Carbon dioxide inhalation dilates cerebral blood vessels,[9] increases cerebral blood flow,[10] spinal fluid pressure,[11] and increases the rate of spinal fluid secretion.[12]

We have demonstrated, as did Davies and Mackinnon,[5c] that the carbon dioxide retention in these patients increases the intracranial pressure as does carbon dioxide inhalation in normal subjects. We interpret this as the result of increased cerebral blood flow from vasodilatation. The assumption of increased cerebral flow on the basis of measurements of increased intracranial pressure is justified under the acute circumstances of these experiments.[13]

The demonstration of increased intracranial pressure in these patients does not explain the production of their mental changes. There are, however, reports of experiments that suggest the explanation of these changes and illustrate the complexity of the problem.

In patients with increased intracranial pressure from brain tumor, there is a critical level of cerebrospinal fluid pressure beyond which cerebral blood flow and cerebral oxygen consumption decrease and coma ensues.[14] This level is 450 mm. of water. Below it the increased cerebral vascular resistance that results from the raised intracranial pressure is compensated for by reflex increase in mean arterial blood pressure; cerebral metabolism and consciousness are thereby maintained. Oxygen inhalation in J. H. and K. B. resulted in cerebrospinal fluid pressures above this critical level. We therefore cannot dismiss the possibility that coma may have resulted from diminished oxygen utilization as a result of the high intracranial pressure per se. If so, the diminished cerebral oxygen consumption and mental changes are in part a function of the duration of intracranial pressure increase, because Patterson and co-workers [10c] found that patients with pulmonary emphysema have a high cerebral blood flow and low cerebral oxygen consumption. When the patients were given high concentrations of oxygen to breathe for 30 minutes, their cerebral blood flow increased without change in cerebral oxygen consumption or mental status. Since the coma that occurs in patients with emphysema who have been given oxygen takes hours to develop, the short duration of their experiments makes them inconclusive.

Kety and Schmidt [10b] have studied the effects of 5% to 7% carbon dioxide and 10% oxygen inhalation for 15 to 30 minutes on the cerebral metabolism of normal subjects. Both hypercapnia and anoxia produce a fall in cerebral vascular resistance and consequent rise in cerebral blood flow. These changes occurred without any fall in cerebral oxygen consumption in the face of the development of mental changes. This surprising result illustrates the complexity of the problem of cerebral function, and the authors state:

> The conclusion is apparent that the higher psychic functions are associated with biochemical changes so subtle and complex as to render any attempt to describe them in terms of mere oxygen utilization no more adequate than to predict the fidelity of a radio by its power requirements.

Studies on cerebral metabolism in diabetic acidosis and coma [15] showed certain relationships between cerebral metabolism and function that are applicable here. Patients in diabetic acidosis without coma have a slightly increased cerebral vascular resistance and decreased cerebral blood flow. In those patients in coma the cerebral vascular resistance is diminished and the cerebral blood flow increased. The greatest difference between these two groups is in cerebral oxygen consumption, which, although depressed in both groups, is much lower in comatose patients. There is a critical level of cerebral oxygen consumption of 2.1 cc. per 100 gm. of brain tissue per minute (normal, 3.3 cc. per 100 gm. per minute), at or below which unconsciousness occurs. The cerebral oxygen consumption is almost completely unrelated to the cerebral blood flow but is well correlated with arterial pH. This suggests that in patients with emphysema and carbon dioxide retention the fall in pH that accompanies hypercapnia may after sufficient time diminish cerebral oxygen consumption by interference with its utilization and effect coma in spite of a greater than normal oxygen supply delivered to the brain.

Other possible mechanisms that have been discussed [5e] are carbon dioxide narcosis, cerebral vasospasm, reflex cerebral depression from high oxygen tension, or direct cerebral depression from oxygen.

We have demonstrated that the intracranial pressure increase is not the result of high oxygen tension itself. K. B. (fig. 1), in whom the spinal fluid pressure was lowered by hyperventilation with 100% oxygen, illustrates this and suggests a method of prevention, namely, that patients with ventilatory insufficiency who need oxygen in high concentrations be encouraged to breathe deeply. If they are conscious and cooperative, this can be accomplished by frequent reminder from an attendant at the bedside for a period long enough to tide the patient over an emergency. If they are not able to follow the directions for breathing given by an attendant, then artificial respiration should be given. In case they do not need high concentrations of oxygen from the start of therapy, following Barach's plan [5e] of gradually increasing the concentration of inhaled oxygen over a period of days would suffice. Unfortunately, one cannot predict with certainty which patients with pulmonary emphysema will suffer the adverse effects of oxygen; therefore all such patients should be under close supervision and their mental status determined at frequent intervals.

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SUMMARY

1. In some patients with pulmonary emphysema the administration of high concentrations of oxygen results in mental changes ranging from somnolence to coma and sometimes death.

2. The effect of oxygen and carbon dioxide inhalation on the pulmonary ventilation and spinal fluid pressure of four patients with chronic pulmonary emphysema and three normal subjects has been studied in an effort to elucidate the mechanism of production of this phenomenon.

3. The inhalation of carbon dioxide by normal subjects increases the spinal fluid pressure through cerebral vasodilatation. In two of the patients with pulmonary emphysema, oxygen inhalation resulted in respiratory depression, carbon dioxide retention, and increased intracranial pressure.

4. The possible mechanisms for the production of this sequence of events and the mental changes in these patients are discussed.

5. Occasional periods of hyperventilation during oxygen therapy will prevent the development of these undesirable effects.

LATE RESULTS OF ARTIFICIAL PNEUMOPERITONEUM IN PULMONARY TUBERCULOSIS

TEN YEAR FOLLOW-UP STUDY OF TWO HUNDRED PATIENTS

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Early results of the use of artificial pneumoperitoneum in the treatment of 200 patients during recent years were reported by Dr. Edwin S. Bennett in April, 1938.[1] From his experience, he concluded that this procedure should be used in the treatment of several groups of patients, which he described. The present paper reviews the status of the same 200 patients 10 years after pneumoperitoneum in order to determine the usefulness of this treatment. Twenty-seven physicians participated in this series of treatments, in which there were no fatalities directly attributable to the treatment. Most of the patients had a poor prognosis before pneumoperitoneum. In almost 90%, the disease was far-advanced, and abundant tubercle bacilli were usually found in the sputum. Other forms of collapse had been tried unsuccessfully in all but nine of the patients. Artificial pneumothorax had been attempted in 90% of the patients. This procedure was often repeated, and it was usually found that there was no free space or only a small, ineffectual collapse. Phrenic paralysis, usually temporary, had been performed in 172 patients, and 3 of these patients had a thoracoplasty operation before the pneumoperitoneum.

The average period of sanatorium care before the pneumoperitoneum was nearly a year. The average duration of the pneumoperitoneum until discharge from the sanatorium was 7.3 months, but many patients continued the treatment with refills after discharge, for from 1 to 40 months. The refills done at the sanatorium averaged 800 cc. of air, and the average interval between refills was one week. In several instances in which, for various reasons, pneumoperitoneum had been abandoned, it was reestablished without difficulty. Pneumoperitoneum had been established in several patients on whom, some years previously, abdominal operations had been performed, after which there had been drainage for a period of months.

Complications that caused marked discomfort and led to discontinuance of treatment arose in 20 patients, or 10% of the cases. In three instances, pneumoperitoneum was discontinued because of the appearance of hernia, although in several other patients, the hernia did not necessitate cessation of treatment. Four patients complained of immediate extreme, but transitory, epigastric and shoulder pain. Today, the latter symptom is considered a favorable prognostic sign. Two patients had extensive subcutaneous emphysema. In seven patients, pronounced distention of the abdomen developed the day after refills were administered; this can be ascribed either to meteorism or to peritoneal effusion. Two patients had pronounced abdominal adhesions that were visible on the roentgenogram, and, in three patients, fluid developed to a degree that required aspiration. In another patient the procedure had to be discontinued because of obliterative peritonitis. A total of 31 patients suffered from hydropneumothorax prior to the initial pneumoperitoneum, and, it developed in 8 more after treatment was begun.

Free fluid, usually clear but occasionally turbid, was found in the abdomen in over half of the 20 patients on whom autopsies were performed, varying from 150 to 1,500 cc. in volume. In addition, a plastic exudate covering the viscera and matting together the coils of the intestines was found in two patients. In other patients, more organized reactions appeared in the form of fibrotic plaques or thickening, which were usually discrete and scattered but were occasionally confluent and extensive, covering the exposed viscera entirely. Although autopsy often revealed considerable peritoneal fluid or thickening, no such observation was made in the five patients on

From the Olive View Sanatorium.

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whom laparotomies were performed during the course of the artificial pneumoperitoneum, and, postoperatively, all the patients had the pneumoperitoneum reestablished.

At the time Dr. Bennett made his report, in 1938, 27 of the 200 patients had died in the sanatorium, and 5 others had died after discharge. Since then, an additional 17 patients have died in the sanatorium, and 61 more died after their discharge, making a total of 110 deaths (55% of the group). The data on all the patients have been reviewed in order to determine whether any prognostic indexes could be found in this material.

The patient's race appears to have little influence on the course of the disease, the fatality rates being, 58% of the 106 white patients, 51% of the 71 Latin-Americans and Mexicans, and 52% of the 23 colored patients, who were chiefly Negroes. There were 48 deaths among the 93 males, about 52% of the group, as compared with 62 deaths among the 107 females, or 58%. There was little difference in the course of the disease in the various age groups, the average age being 28 years in both the survivors and those who died.

Associated phrenic paralysis appeared to have a beneficial influence in this series, the fatality rate being only 44% of the 15 patients who had such operations both before and after the induction of pneumoperitoneum and 49% of the 60 patients who had phrenic paralysis before pneumoperitoneum was instituted. This compares favorably with a fatality rate of 64% among those in whom the phrenic was paralyzed some time after pneumoperitoneum, and 84% of the 26 patients who did not have phrenic paralysis. Although there were numerous exceptions, it appeared, in general, that the patients in whom the paralyzed diaphragm rose more had, in this series, a somewhat lower, later fatality rate. The average rise of the diaphragm in the patients with phrenic paralysis was about 4 cm.

Cavities were found in the lungs in all but seven patients, and the prognosis was, in general, worse when there was larger, multiple, or bilateral cavitation, but the position of the cavities, whether they were in the upper or lower part of the lungs or whether they appeared to be central or peripheral on the roentgenogram, did not seem to affect the later fatality rates. The erythrocyte sedimentation rate was greatly accelerated in almost all patients, but, in general, the sedimentation rate was somewhat slower in those who survived and slowed more after institution of the pneumoperitoneum.

The severity of the disease may be indicated by the abundance of tuberculous complications clinically recorded prior to the institution of artificial pneumoperitoneum, including 39 cases of pleural effusion, with nine empyemas and four chest wall abscesses with one broncho pleural fistula, 36 cases of tuberculous enteritis with 10 tuberculous appendixes, 9 cases of tuberculous fistulas, 34 cases of tuberculous laryngitis, and 13 cases of tuberculous tracheobronchitis. Many more complications existed, but these were not recorded, as was indicated by the autopsies of the 20 who were examined.

In only 18 patients was the disease apparently arrested or arrested at the time of discharge from the sanatorium, and in 30 other patients it was said to be quiescent. Only 11 (23%) of these patients died subsequently. On the other hand, of the 72 patients discharged as "improved" and the 36 discharged as "worse," 55 (50%) have died.

Of the 200 patients in this series, pneumoperitoneum was induced in 35 for intestinal or peritoneal disease, of whom 23 (66%) died and 34 for tuberculous infiltration or pneumonias, of whom 19 (56%) died. A total of 74 patients were treated for cavities, of whom 36 (48%) died, and 56 were given pneumoperitoneum for symptomatic relief only, of whom 31 (55%) died. In comparing the early clinical results with the indications, it was concluded that the pneumoperitoneum had some desirable effect in only 65 (33%) of the patients, among whom only 20 (31%) died later, whereas, among the 135 in whom it had been entirely ineffective, 90 (68%) had died.

Pneumoperitoneum was terminated by death in 24 patients and because of discomfort or abdominal fluid in 28 patients; it was discontinued to allow more definite therapeutic measures in 20 patients. In 33 patients, it was abandoned as obviously ineffective, and in 87 it was still being given at the time of discharge from the sanatorium. In only one patient was pneumoperitoneum discontinued, while he was in the sanatorium, as an unqualified success, no longer needed; however, to this success should be added the 20 patients in whom, after pneumoperitoneum, thoracoplasty or other surgical measures that could not have been previously used were found feasible. A study of this group of 20 patients shows that 5 patients were unimproved or grew worse; 6 were improved; 1 case was quiescent; 1 patient worked for two years and 7 have been working for seven to nine years.

Ten years after most of the patients received their initial pneumoperitoneum, only 38 patients (40%) of the 90 living, reported that they were able to work. Many of these were enthusiastic over the benefit that they believed they had received from the treatment, and the physicians were often pleasantly surprised by the unexpected favorable results.

Of the 90 now living, 7 had arrested cases on discharge; 8 had apparently arrested cases; 22 had quiescent cases; 24 had improved cases; 24 had unimproved cases; and 6 deserted or left against medical advice. The reports made by our follow-up workers show that they were engaged in varied economic activities, ranging from the duties of a housewife, in some cases limited, to a full-time truck driver's job.

The incidence of survival, improvement, and recovery after induced pneumoperitoneum treatment in this series of patients with far-advanced cases is low. While its use in this series of patients would seem to have been justified, the results suggest that pneumoperitoneum should not be allowed to substitute or delay the institution of more direct and effective forms of treatment. It is still felt, however, that this procedure has therapeutic value, which may be more clearly brought out in later series, when it is applied to more favorable forms of the disease, and especially when it is supplemented by chemotherapy and other therapeutic measures.

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POSTOPERATIVE BACTERIAL SYNERGISTIC CELLULITIS OF ABDOMINAL WALL

FATALITY FOLLOWING HERNIORRHAPHY

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In this era of antibiotics and chemotherapeutic agents the incidence of postoperative wound infections has been reduce to a negligible percentage. This is due not only to these new agents but also to improvement in the efficiency of personnel, sterilization of instruments and fields, and improved surgical techniques that follow the basic concepts of good surgery and good tissue care. Against this background, there occur, rarely, certain infectious complications of normal surgical treatment. These complications, at first slow-moving, are insidious, relentless, and almost totally resistant to the usual modes of treatment. All concerned, the surgeon, the physician, the bacteriologist, and the pathologist, may well conclude that much is yet to be done in the field of bacteriology in assessing the specific organism or organisms causing such an infection and in determining the best specific therapy to combat them.

All types of chronic gangrene, although characterized by certain differences, are caused by special combinations of organisms. They may be conveniently classified as follows:[1] (*a*) postoperative progressive bacterial synergistic gangrene of the abdominal or chest wall, (*b*) gangrenous impetigo or ecthyma, (*c*) fusospirochetal infection of the skin, and (*d*) amebic infection of the skin. We are concerned with the first type as it affects the abdominal wall. This type of infection, due to an unusual synergism, has been described by Meleney,[2] Mester,[3] Brewer and Meleney,[4] Carroll,[5] Lichtenstein,[6] Dodd,[7] and Bassow.[8] Vier [9] has pointed out that it may be seen but once or twice in the experience of the average surgeon; he states, ". . . but when it does occur, it is so devastating to patient and distressing to surgeon that one is impressed with the importance of its early diagnosis and treatment." Cultures taken from such a gangrenous area contain microaerophilic nonhemolytic streptococci associated with hemolytic micrococcus pyogenes aureus.

The purpose of this paper is to report a case of a postoperative progressive inflammation of the anterior abdominal wall, in many ways similar to and as distressing as the gangrenous form. The infection was manifested grossly as an intense edematous type of cellulitis, with no evidence of gangrene. An anaerobic Streptococcus and a gram-positive hemolytic aerobic Bacillus identified as B. subtilis were isolated from the tissue. Injection of these organisms in combination into animals produced a similar tissue lesion.

REPORT OF A CASE

A 37-year-old white man was admitted to the Jewish Hospital Nov. 6, 1945, with the chief complaint of a hernia of 20 years' duration. The patient had first noticed a lump in the right groin. This lump had enlarged progressively over the course of years, and for the last 10 years the patient had been wearing a supportive truss. He had no other complaints referable to this local area. There were no gastrointestinal, genitourinary, or musculoskeletal symptoms. None of the other systems were contributory to his condition. The patient had been a regular blood donor and had made donations on 20 occasions prior to this admission. It was believed that these donations were properly spaced (not more frequently than every four to six weeks). Physical examination revealed a well-developed, well-nourished man in no distress and appearing to be in good health, except for the hernia, which he had elected to have removed. The temperature was 97.3 F, pulse rate 80, respiratory rate 20, and blood pressure 105/70 mm. Hg. The head and neck regions were normal, and the heart and lungs were normal. The abdomen was normal, except for the right lower quadrant, in which the right inguinal ring was enlarged. Preoperative laboratory data were as follows: urine normal; hemoglobin, 15.6 gm.; red blood cell count, 5,100,000; white blood cell count, 6,900, with 71% polymorphonuclear neutrophils (96% filamented and 4% nonfilamented), 28% lymphocytes, and 1% monocytes; blood sugar, 94 mg. per 100 cc.; and blood urea nitrogen, 14 mg. per 100 cc.

The preoperative diagnosis was right incomplete inguinal hernia. Two days after admission a Gallie herniorrhaphy was performed, with the patient under spinal anesthesia. Fascia lata strips from the left thigh, obtained with a Matson stripper, were employed in the repair. One gram of sulfadiazine was sprinkled into the wound, and closure was effected with clips. The patient's condition was good when he was returned to his room. In the first 24 hours after the operation the temperature climbed to 102 F and the pulse rate from 80 to 100. The blood pressure was 120/95 mm. Hg. On the ninth postoperative day there was slight tenderness and pain around the incision and the tissue seemed to be firmly indurated and edematous. The temperature at this time was 99.2 F. On the following day, after he had received a total of 160,000 units of penicillin in 21 hours, he was noted to be perspiring profusely and to have a rapid pulse rate. His temperature was normal. On Nov. 19 the wound area was anesthetized with procaine hydrochloride (novocaine®), and the wound was opened and a rubber-dam drain inserted. A culture grown from material taken from the site yielded colonies of aerobic hemolytic, gram-positive bacilli. The broth contained gram-positive streptococci in chains and gram-negative bacilli. The blood culture showed no growth after three days. On the 12th postoperative day the patient stated that he felt weak and

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exhausted. He had perspired profusely during the night and had required 10 changes of clothing. He began passing small amounts of urine at frequent intervals. The lower quadrants of the anterior abdominal wall were considerably indurated, had the consistency of leather, and were edematous. This condition extended to the contralateral side. In addition, the penis was remarkably swollen, rendering micturition difficult. The pulse was difficult to palpate, and the blood pressure was 110/100 mm. Hg.

The condition at this time was believed to be an incisional abscess with cellulitis. The incision was reopened and the rubber-dam drain reinserted. There was no evidence of pus, despite the fact that several skin incisions had been made. The attending surgeon was impressed with the tissue consistency and stated that it cut as though it were leather. The patient was put into the position for shock, and administration of plasma and sulfadiazine was begun. Every three hours 30,000 units of penicillin was given. (It was not customary to give massive doses of penicillin at that time.) On the 13th day the patient was unimproved. The areas of induration and edema had advanced cephalad, the pulse was not palpable, and there was no recordable blood pressure. The patient was very apprehensive. He became dyspneic, and within a period of five to eight minutes he became successively more dyspneic, restless, talkative, delirious, and cyanotic. Venesection did not function, the most apparent reason being that intravascular clotting had begun. He was given a mixed gas gangrene antitoxin, 10,000 units intravenously, and an equal dose intramuscularly. He died on the 13th postoperative day.

Autopsy.—At autopsy the tissues in the incision were found to be partly necrotic, grey, and very firm; no pus or odor was noted. There was no evidence of gas formation in the tissues. The entire abdominal wall of the right lower quadrant and the medial third of the left lower quadrant were indurated and swollen. The overlying skin was a mottled purple color. The scrotum and both legs, particularly the right one, were edematous. Opening of the abdominal wall revealed the following condition: About an inch below the umbilicus, there was a sharply demarcated change in the subcutaneous fat underlying the abdominal wall. The tissues were brawny, indurated, and mottled hemorrhages were scattered throughout. The fat was greyish. There was no odor, pus, or gas in the deeper tissues. The rectus muscle on the right was completely involved by this process; it was swollen and greyish, and there were petechiae scattered throughout. The left rectus muscle of the lower quadrant showed early involvement. The preperitoneal fat was also indurated and swollen. The omentum was fatty, and the portion lying in the right lower quadrant seemed firm and edematous; it was exceptionally solid when cut. The terminal ileum was anchored to the pelvis by an abnormal band of peritoneum.

The vessels were essentially normal. The heart weighed 360 gm. and was somewhat flabby. The lungs were firm and congested, without edema, and both weighed 510 gm. The spleen weighed 200 gm. and was flabby, mushy, and dull red on section, with loss of architecture. The lymph nodes were normal. The kidneys weighed 180 gm. The liver weighed 2,660 gm. and was flabby and pale, the cut surface being tan to orange. The pancreas was congested, and the adrenal glands showed decreased cortical lipid. In the skin and subcutaneous tissue there were multiple capillary hemorrhages, with a fibrinous exudate but with no cellular reaction (inflammatory cells). A section from the incision area showed fibrinous exudate with a greater cellular reaction. There was necrosis of the vein and artery in the area of the incision and degeneration of adipose tissue. A section from the rectus muscle showed edema, congestion, necrosis, hemorrhage, and an extensive fibrinous exudate with little or no inflammatory cell reaction. Microscopic examination revealed that an overwhelming toxemia had followed infection of the herniorrhaphy wound, with all vital organs showing severe toxic and degenerative changes.

Bacteriological Observations.—Bacteriological examination at autopsy corroborated the previous observations. An anaerobic nonhemolytic Streptococcus and a gram-positive hemolytic aerobic Bacillus identified as belonging to the species B. subtilis were isolated from material taken from the edematous skin wound. When injected intradermally into guinea pigs and a rabbit, they produced edema and induration of the subcutaneous tissue. Similar effects were observed when a mixture of the cultures was injected into the muscles of guinea pigs.[10]

COMMENT

Postoperative progressive bacterial synergistic gangrene is due, as are the other chronic gangrenes, to the symbiotic action of two or more organisms. This symbiosis seems to develop in the area involved in the operation and probably in tissue that has been altered to favor such complimentary growth. In the case we have described, the predominant feature, in contrast to other lesions that have been described in this anatomic area, was an intense board-like edematous cellulitis rather than a gangrene. In nearly half a century of surgical practice we have never encountered an infection of this type. Although the presence of an anerobic nonhemolytic Streptococcus seemed typical for such an infection, that of its symbiotic mate, a variety of B. subtilis, did not. The family of B. subtilis is recognized to be of low pathogenicity. It is used as a test organism for sterilization procedures.[1] The pathogenicity of the anaerobic Streptococcus depends upon the proper conditions. These two organisms, as the major symbiotic pair, in the presence of suitable damaged tissue, appear to have been the causative agents. It may be that the other organisms played a supporting role or were secondary invaders. Weiss [11] has demonstrated that in a variety of infections harboring the anaerobic nonhemolytic Streptococcus a multiplicity of organisms was present.

Interesting facet of this case was the fact that the patient had been a frequent blood donor prior to the operation. There was no reason to suspect that these multiple bleedings had a deleterious effect on the condition of the peripheral blood; on the contrary, the hemoglobin and red blood count on admission to the hospital were good. Snapper, Liu, Chung, and Yu,[12] in 1939, studied 101 blood donors who had donated from 1 to 25 liters of blood in periods ranging from 2 months to 10 years; the frequency and extent of anemia increased with an increase in the total amount of blood withdrawn or in the duration of the service. In our patient there was no reason to suspect damage to the hemopoietic system as reflected in the peripheral blood. Doan and Cunningham [13] used rabbits experimentally as donors on many occasions. The bone marrow of these animals showed extreme hyperplasia of bone marrow elements, but they also showed small noncellular areas from which the myeloblasts had disappeared. The authors felt that the evidence indicated a secondary anemia of long standing. There were also small acellular areas containing either a hyaline-like structureless, ground substance or fine globules of fat, and abnormal myeloblasts were evident. In our patient the peripheral blood response was adequate, and there was no reason to suspect a faulty bone marrow. It is possible that there was some fault in tissue resistance engendered by the multiple bleeding, which may have, in

10. The bacteriological investigations for this case were done under the supervision of Dr. Charles Weiss.

11. Weiss, C.: The Pathogenicity of Bacteroides Melaninogenicus and Its Importance in Surgical Infections, Surgery **13**: 683, 1943.

12. Snapper, I.; Liu, S. H.; Chung, H. L., and Yu, T. F.: Anemia from Blood Donation: A Hematological and Clinical Study of 101 Professional Donors, Chinese M. J. **56**: 403, 1939.

13. Doan, C. A.; Cunningham, R. S., and Sabin, F. R.: Contributions to Embryology, Washington, D. C., Carnegie Institute, 1925, vol. 16, p. 163.

association with the local trauma resulting from surgical procedure, prepared the bed for the resistant infection that followed.

The anaerobic organisms are generally resistant to the action of chemotherapeutic agents, including both the sulfonamides and penicillin, and this is also true when they are in synergism with other organisms. As with the gangrenous forms of infection,[14] phlegmonous or cellulitis infection should be treated intensively, early, and specifically according to the etiological agents.

SUMMARY

1. A fatal case of postoperative progressive abdominal wall cellulitis is reported.

2. The primary etiological factor appeared to be a synergism between an anaerobic nonhemolytic Streptococcus and a gram-positive hemolytic aerobe of the species Bacillus subtilis.

3. Postoperative progressive synergistic bacterial gangrene and cellulitis are similar in clinical course, etiology, predisposition, resistance to treatment, latent period, general anatomic location, and rarity. They differ greatly, however, in appearance.

4. Bacteriological study of postoperative wound infections, even in this era of advancing antibiotic therapy, is still of importance. The organisms causing such an infection should be determined definitively, and the infection should be eradicated early.

Suite 1704, 255 S. 17th St. (3), (Dr. Behrend).

14. Meleney, F. L.: A Differential Diagnosis Between Certain Types of Infectious Gangrene of the Skin, with Particular Reference to Haemolytic Streptococcus Gangrene and Bacterial Synergistic Gangrene, Surg., Gynec. & Obst. **56**: 847, 1933.

ACCIDENTAL POISONING BY TOXAPHENE

REVIEW OF TOXICOLOGY AND CASE REPORTS

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A recently developed insecticide, which has demonstrated its effectiveness against a variety of agricultural and livestock insect pests, is chlorinated camphene, commonly known as toxaphene. The empirical formula is $C_{10}H_{10}Cl_8$. The technical material is an amber waxy solid with a mild terpene odor. It contains from 67 to 69% chlorine and melts at temperatures of 70 C to 95 C. It is soluble in the common fat solvents and insoluble in water.

Single dose administration of toxaphene to laboratory animals shows a variable toxicity, depending on the physical form of the poison, the concentration, and the vehicle and means of administration. In white rats the oral L. D. 50 for a 1% emulsion in peanut oil and acacia is 40 mg. of toxaphene per kilogram of body weight of the animal.[1] The L. D. 50 in the rat for a 20% kerosene solution is 100 to 150 mg. per kilogram, for a 5% solution in kerosene, 300 to 350 mg., and for a 5% solution in corn oil, 120 to 125 mg. The intravenous L. D. 50 in the rat with a 1% toxaphene emulsion in peanut oil and acacia is approximately 13 mg. per kilogram.[1] In guinea pigs the L. D. 50 by oral administration of 5% toxaphene in kerosene is 350 to 375 mg. per kilogram, and of 5% toxaphene in corn oil, 250 to 280 mg.[1] In the dog, Lackey [2] found that generalized convulsions resulted from doses as low as 10 mg. per kilogram, when a digestible oil was used as a vehicle. The average lethal dose from oral administration in dogs lay somewhere between 15 mg. and 40 mg. per kilogram.

Toxaphene, in a suitable vehicle, can be absorbed through the skin of rabbits. From peanut oil solution on the skin, a dose of 250 mg. per kilogram may kill the rabbit in 24 hours.[1] From kerosene solution, 100 mg. per kilogram applied to the skin daily for six days gives a high mortality rate in the rabbit and guinea pig. By contrast there is poor absorption by the skin of toxaphene mixed in an inert powder. Rabbits require 500 to 1,000 mg. per kilogram of toxaphene, applied in a 40% dust, to give symptoms of poisoning or death in 24 hours. This species is unaffected by daily application to the skin for six weeks of a 5% toxaphene dust at the rate of 125 mg. toxaphene per kilogram.[1]

It has been found that feeding toxaphene at rates of 100 ppm and 800 ppm in the diet of white rats and guinea pigs for a period of six months shows no significant effect on growth, blood cell count, urinalysis, reproduction, mortality, or histological findings.[1] A study of chronic toxicity in the dog has been reported by Lackey.[2]

From these and other unpublished observations on the effects of toxaphene on 10 species of animals, it has been found consistently that the manifestation of poisoning by this insecticide is diffuse stimulation of the cerebrospinal axis resulting in generalized convulsions. Sublethal doses cause shorter and fewer convulsions than do higher doses. If the dose is lethal, death is due to respiratory failure after a series of convulsions of increasing severity.

Barbiturates protect dogs against supralethal doses of toxaphene. After recovery from the barbiturate anesthesia the animals show no abnormal neurological signs suggestive of organic pathology in the central nervous system. Apparently, the effects of the insecticide on the nervous system are drug-like and reversible. The strikingly selective action of toxaphene on the central nervous system can best be explained by its high lipoid solubility. Lackey concluded that the barbiturates were the preferred depressants in protecting dogs against poisoning.

1. Shelanski, H. A., and Gellhorn, A.: Unpublished data.

2. Lackey, R. W.: Observations on the Acute and Chronic Toxicity of Toxaphene in the Dog, J. Indust. Hyg. & Toxicol. **31**: 117 (March) 1949; Observations on the Percutaneous Absorption of Toxaphene in the Rabbit and the Dog, ibid. **31**: 155 (May) 1949.

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"If convulsions begin before treatment is instituted, sodium pentobarbital seems to be the drug of choice." [3]

During the five years in which chemists have done research on this material and in which scores of workers have been potentially exposed during manufacture of toxaphene there has not been an instance of poisoning in man. Periodic examination of these workers has shown no alteration in reflexes, subjective manifestation of disorders of the nervous system, or other signs of health impairment. Urinalyses and blood cell counts have been normal; furthermore, we have learned of no instances of accidental poisoning among workers exposed in the manufacture of insecticides containing toxaphene. Such exposure to a worker in a well-controlled manufacturing operation would undoubtedly be minimal. In some instances, however, it is known that recommended precautions in manufacturing processes have been ignored. Since several hundred men have been involved in such work it is apparent that the hazard from inhalation and skin absorption by man is actually not great. Such agents as solvents, inert dusts, and chlorine have been more troublesome than toxaphene from the point of view of the worker during manufacturing and compounding.

As with other economic poisons used in agriculture, one may expect that increasing use of toxaphene will be accompanied by instances of human poisoning through accidents and careless misuse of the agent. Physicians will be called on to treat such patients, and it is for this reason that a discussion of the essential pharmacological properties of toxaphene has been presented. Such pharmacology is based on observations made largely in laboratory animals that were poisoned by known doses of technical toxaphene. When the material appears in insecticides, it is diluted or dispersed with dusts, solvents, and water, and may be found mixed with other insecticidal materials. The latter may modify the manifestations of poisoning. The label on finished insecticides should show the presence and quantity of active ingredients.

The following case reports describe instances of death or illness that, in our opinion, were probably due to toxaphene. The poison was taken by mouth in each case. The symptoms were those to be expected from toxic amounts of toxaphene.

REPORT OF CASES

CASE 1.—A Negro boy, aged 2 years and 8 months, played in a yard where there were strips of metal from flattened drums from which technical chlorinated camphene (toxaphene) had been removed previously in a processing plant. The metal sheets had been brought from the plant and part of them used that day to cover the walls of a garden tool storage shed. An amber-colored, beeswax-like material, identified as toxaphene, was subsequently found on and readily scraped from the metal sheets. No one saw the child ingest this material, but it was available to him, and he was known to have played in the vicinity of the sheets. The lack of taste and softening of technical toxaphene at body temperature enables one to chew it as readily as paraffin wax. The child left the play yard before 5 p. m. on this particular afternoon, had a bath and ate his supper, and played in his home until bedtime, at 8 p. m. There was no sign of illness until he awoke just after midnight, screaming and in a convulsion. The child was taken to the emergency ward of a hospital at 1 a. m. Here he received an unidentified hypodermic or intramuscular injection but continued to show intermittent convulsions. An hour later an attempt was made to transfer the patient by car to another hospital. He died en route at about 2:30 a. m. during a convulsion. At autopsy it was found that a "pale froth" was exuding from the mouth, the heart was greatly dilated, and the lungs were markedly congested and edematous. The bronchial tree was filled with a faintly blood-tinged froth; there was no foreign material in the respiratory tract. The stomach "was dilated with air." The liver, gallbladder, and spleen were grossly normal. There was much hard fecal material in the rectum. The kidneys were "rather swollen and the hilus of the right kidney showed a purulent-like material, possibly a pyelitis." A few petechial hemorrhages were found in the white substance of the brain. "No old scars of birth injuries were noted." In stating the immediate cause of death the pathologist reported "symptoms and pathological findings are consistent with a death from a central nervous system poison of a convulsant-type. Actual death was due to suffocation during a convulsion."

CASE 2.—A 4-year-old white boy is believed to have ingested an unknown quantity of toxaphene emulsion in water from a gallon jug. The child's stomach was probably empty at this time. The first convulsion occurred about two hours later and continued at two to five minute intervals until death. Death occurred about six hours after the time the poison is believed to have been ingested. Intramuscularly administered magnesium sulfate, phenobarbital sodium, and curare and cyclopropane anesthesia were used in treatment at a hospital shortly before death of the patient. Autopsy was not performed.

CASE 3.—A 17-month-old white boy played where his father was mixing toxaphene for a tobacco spray. The youngster picked up a tin cup being used in this process and drank at 6 p. m. what his father called "about a half teaspoon of full-strength toxaphene" (an investigator designated this a solution of toxaphene, presumably a 60% concentration in special solvents). After an unspecified interval, convulsive seizures developed in the child, which recurred with increasing frequency until death at 5 a. m. the following morning. There was no autopsy, and no details are available regarding treatment other than that medical care was given within an hour of the ingestion of poison.

CASE 4.—A 2-year-old Negro boy is believed to have ingested an unknown amount of toxaphene. The history stated "while his mother was working in the cotton field, the child ingested a large amount of a chemical containing 20% toxaphene." After an undetermined interval, convulsive episodes developed in the child. He was hospitalized within one-half hour of the onset of the convulsions, and the record of physical examination described the child as "a well developed, well nourished colored male infant who exhibits mild cerebral excitement with hypertonicity of all extremities; aimless jerking motions of all extremities, proceeding to generalized convulsions associated with marked pharyngeal and laryngeal spasm and respiratory embarrassment and cyanosis. E.E.N.T.: Pupils are fixed and dilated. Eyes have a wild, staring expression. Otherwise, negative except for enlarged tonsils. Neck stiff, back bowed: Heart and lungs clear to percussion and auscultation. Abdomen: negative except for spasm of the anterior abdominal wall." The child received "large doses of sodium luminal and curare intramuscularly." Artificial respiration with an air way in place was given during the convulsive episodes. He remained in a critical condition for several hours. Twelve hours after admission to the hospital, he was in relatively good condition and recovered with no untoward symptoms. He was discharged two days later.

Two instances have been found of group poisoning believed to be due to toxaphene, following its misuse as an agricultural pesticide. All these patients recovered.

CASE 5.—A Negro farmhand sprayed a collard patch twice on Oct. 4, 1951, with an insecticide that contained approximately 9% toxaphene as an aqueous emulsion. On Oct. 7, a Negro woman, aged 49, picked collards from this patch, washed them three times in different water, and cooked the greens for one hour with a piece of salt pork. Her family of seven ate the greens at 5 p. m. (no other meal had been served since breakfast). At about 6:30 p. m. she "got sick at the stomach," vomited, and took 2 oz (60 cc.) of castor oil in vinegar. She thought little of the episode because she "has a lot of gas most of the time." She had no further symptoms.

3. Lackey, R. W., and Weed, O.: Treatment of Acute Toxaphene Poisoning in the Dog, South. M. J. 44: 165 (Feb.) 1951.

At 7:30 p. m. a 20-year-old Negro woman fell to the floor in a convulsive seizure lasting 10 minutes. After the convulsion, she became lucid but had no recollection of having fallen or of the convulsion. At 8:15 p. m. she had a second convulsion coincident with her arrival at a hospital. A stomach tube was passed, and the stomach was lavaged with 2 liters of warm sodium bicarbonate solution. Vomiting of "a large amount of collard greens" followed this treatment. At 10 p. m. 2 grains (0.13 gm.) of phenobarbital sodium was given subcutaneously. No further symptoms were observed. At 8 p. m. a Negro girl, aged 12, fell suddenly in a convulsion. This was followed by a lucid period of about 20 minutes' duration and then another convulsion at 8:30 p. m. At the hospital she was given apomorphine hydrochloride, 0.05 grain (3 mg.), by hypodermic and gastric lavage. "An enormous amount of collard greens were evacuated within a short interval." She received 2 grains (0.13 gm.) of phenobarbital sodium subcutaneously that night, ate a good breakfast the following morning, and objected to being kept home from school, since she felt entirely well. A 16-year-old Negro girl had brought the two patients described above to the hospital. She had no evidence of illness until she fell unexpectedly in a convulsion in the hospital corridor. The fit lasted three to four minutes, after which she was quite rational and cooperated in drinking a quart of warm water containing sodium bicarbonate. She was given apomorphine hydrochloride, 0.10 grain (6 mg.), after which she vomited a "copious amount of collard greens." The onset of her convulsion was approximately 3 hours and 45 minutes after eating the greens. She received phenobarbital sodium and had no further convulsions. The following morning there were no complaints or physical findings other than "weakness and lassitude." In the woman who had picked and cooked the greens and in three other members of the family, 30, 10, and 7 years in age, symptoms of poisoning did not develop during medical observation. Four hours after ingesting the greens each of them was given 2 oz. of castor oil. Subsequent examination of members of this family has revealed no evidence of disease. On Oct. 8, an examination of the garden showed that it was badly grown up in weeds and that both weeds and collard greens were severely burned by the spray material. Samples of the collard leaves were forwarded to the experiment station of the Hercules Powder Company for analysis for organic chloride content. The results of the analysis are shown in table 1. An extremely heavy insecticide residue was present on all of the material. Since toxaphene, like other chlorinated toxicants, is not soluble in water, washing in water does not remove significant amounts of the material from vegetation. On the basis of the analyses, one may calculate the amount of toxaphene ingested by assuming quantities of the greens that may have been eaten (table 2).

TABLE 1.—*Residual Toxaphene on Collard Greens*

Sample	Description	Organic Chlorine Calculated as Toxaphene, Ppm
1	As picked	3,312
1-A	As picked	3,318
2	Washed 3 times	3,126

CASE 6.—In the second instance of group poisoning, a white man sprayed his garden chard with an unspecified amount of toxaphene one morning and harvested the same chard leaves for the family meal that evening. The chard was washed before it was cooked. The meal was eaten at 6 p. m. by the man, his wife, and their son. At 10 p. m. the son was awakened from sleep by a "jerking and twisting" in his muscles. He left his bed feeling ill and provoked vomiting by placing his fingers in his pharynx. He was given strong coffee and tea and forced to vomit repeatedly. At 11 p. m. the man found that his "mind went blank with no warning of nausea or any symptom." Within two or three minutes he fell in a "stiffened heap on the floor." The wife and son lifted him to a couch, pried his "locked jaws open," and forced him to vomit. He is reported to have been unconscious for an hour. No mention is made of clonic movements. At an unspecified time his wife noted lightheadedness and a feeling of mild nausea but could vomit only by deliberately provoking it after taking fluids. The patients were not seen by a physician that night. The man reported the episode by letter, which included these statements: "We are fifty miles from a doctor; no help there. The family was extremely weak for several days. Two days after the poisoning I went to a doctor, and he said if I were all right as far as emptying out the digestive tract, there would not be after effects. However, I did have amnesia for about a week. There were many things I did about the ranch that I could not remember having done two weeks later, such as moving machinery and tasks accomplished." He stressed the absence of warning symptoms, nausea, and cramps, and stated that vomiting had to be induced in himself and his family.

TABLE 2.—*Dose of Toxaphene in Relation to Amount of Collard Greens Ingested*

Weight of Greens		Residual Toxaphene, Mg.	Dose of Toxaphene in Mg. Kg. of Body Weight *
Gm.	Lb.		
200	0.44	663	9.5
500	1.1	1,658	24.0
1,000	2.2	3,315	47.0

* Assuming a body weight of 70 kg. (154 lb.).

These case reports appear to confirm the laboratory findings that toxaphene acts chiefly as a convulsant drug. No clinical picture of chronic poisoning in man has been developed. This is consistent with Lackey's finding [2] that dogs receiving a convulsant dose of toxaphene daily appear alert and behave normally except for the convulsion. Such doses given over long periods can produce in dogs degenerative cellular changes in the liver and kidney. There were no manifestations of poisoning in these cases until the acute overstimulation of the nervous system occurred following absorption of the poison. In human poisoning, in contrast to that sometimes noted in the dog, vomiting apparently must be induced (one possible exception is mentioned above). There is no abdominal cramping or diarrhea to serve as evidence of poisoning.

SUMMARY AND CONCLUSIONS

1. Three deaths in children presumably resulted from accidental ingestion of lethal amounts of an insecticide, toxaphene. A fourth child so poisoned recovered.

2. Two instances of group poisoning, that followed ingestion of toxaphene-sprayed collards and chard, respectively, have come to our attention. Among 10 persons known to have eaten the contaminated greens, in 7 symptoms developed consistent with toxaphene poisoning as seen in laboratory animals.

3. The onset of poisoning characteristically was abrupt and not associated with abdominal pain, involuntary vomiting, or diarrhea. Illness is manifested by a skeletal muscle response to central nervous system stimulation and by loss of consciousness.

4. These instances of poisoning in humans have resulted from accidents or injudicious use of the pesticide.

5. Since similar poisoning may occur in the future, it is essential that physicians recognize the cardinal symptom, a convulsion, and the importance of countering the acute central nervous system stimulation with barbiturates.

6. The complete absence of poisoning in workers who manufacture toxaphene and in those who are exposed to it, both in the compounding of pesticides and its use in agriculture, suggests that it can be handled with safety.

7. This and other effective pesticides are known poisons and must have lethal qualities if there is to be progress in man's war against insects. Such chemicals should be used properly and with precautions against human consumption if tragedies are to be avoided.

Delaware Trust Building (Dr. McGee).

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LOW HEMOGLOBIN LEVELS IN WOMEN AS REVEALED BY BLOOD DONOR RECORDS

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In American Red Cross blood procurement records women constitute a minority of the donors represented. The greater response by men can be attributed largely to more intensive recruitment among male employee groups, to less fear of venipuncture, and to more widespread knowledge of the therapeutic uses of blood and its derivatives, gained while serving in the armed forces. Furnishing the stimulus for the present report, still another element of the disparity is the fact that on presenting themselves many more women than men are found to be unacceptable because of low hemoglobin levels.

Previously unpublished information concerning the incidence of low hemoglobin levels can be derived from mass data pertaining to white persons who volunteered to contribute blood in the period January, 1948, to June, 1949, inclusive.[1] All ranged in age from 18 through 59. Shown in table 1 are figures on 239,191 persons (165,408 men and 73,783 women) [2] who volunteered to make their first donations at the regional blood collecting and processing centers or mobile unit operations.

Compared to less than 1% of the men, 12.6% of the women were unable to meet a requirement of 12.3 gm. of hemoglobin per 100 cc. of blood, which was the minimum for acceptance of a person as a blood donor.[3] A copper sulfate technique modified from the method of Phillips and co-workers [4] was employed in all determinations.

During the past two years occasional checks have disclosed a practically unchanged aggregate number of low hemoglobin level disqualifications per 100 women. Assuming that the women who present themselves at the Red Cross centers are above the general average in health, a less satisfactory situation must exist in the nation as a whole. By extending census figures we place the total number of women who range between 18 and 59 years old, inclusive, at approximately 47 million. Risking

TABLE 1.—*Donors and Disqualified Persons in Selected Groups*

	Men	Women
Total no. of persons	165,408	73,783
Number disqualified		
All reasons	13,798	15,233
Low hemoglobin level	1,382	9,322
Percentage disqualified		
All reasons	8.3	20.7
Low hemoglobin level	0.8	12.6

an insecure estimation, the number of women deficient in hemoglobin and therefore potentially disqualifiable may run from nearly 6 million (calculated from the Red Cross data) to well over 10 mllion. Anemia is bound to engender rising medical interest if the hospital demand for blood should continue to increase, since procurement would be broadened to encompass larger segments of the population, and women would be prevailed on to donate in greater numbers.

Analytical discussion is now feasible with special reference to a selected group of 6,911 women, included in table 2. All successfully donated blood on first visits and came back within one year to do so again. Thereupon 12.3% were disqualified owing to a low hemoglobin level. On the average the group members were 37.3 years of age at the time of second visits and had waited 5.6

TABLE 2.—*Distribution of Selected Women According to Interval Between First and Second Visits and Average Ages*

No. of Months Between First and Second Visits	Number			Percentage Disqualified	Average Age (Years)	
	Total	Disqualified	Accepted		Disqualified	Accepted
Under 2	224	13	211	5.8	33.3	33.3
2- 3.9	2,084	278	1,806	13.3	37.1	37.7
4- 5.9	2,041	274	1,767	13.4	37.0	37.8
6- 7.9	1,297	164	1,133	12.6	37.5	37.5
8- 9.9	741	82	659	11.1	35.3	36.9
10-11.9	524	41	483	7.8	36.3	36.0
Total	6,911	852	6,059	12.3	36.9	37.3

months before returning. From tables 2 and 3 we find that those rejected (1) were relatively more numerous among persons returning from 2 to 10 months than earlier or later, (2) averaged 5 months younger than the women accepted, (3) were relatively more numerous among persons between 21 and 50 years than younger or older, and (4) averaged six days sooner in returning than those accepted.

Whether the group was considered compositely or divided into subgroups according to the period between the first and second visits to permit views of the net relationships, a characteristic pattern unfolded. Starting with approximately 9.1% of the women 18 years old, the gross low hemoglobin level disqualification curve proceeded upward to a plateau, was above 13.5% from 34.5 to 44.5 years, and then declined to 6.3% by the end of the 59th year. Though differing in magnitude from one subgroup to another, the rejection rates adhered to the general trend no matter how long the interval to the second visit. Incidentally, the variations strengthen the frequently expressed view that women in their fifties, usually poorly represented in blood program records, should be desirable for donor recruitment.

From National Headquarters of the American National Red Cross.

1. In the period designated, the blood program was composed of nine constituent programs, located in the following regions: Rochester, N. Y.; Wichita, Kan.; Atlanta, Ga.; Washington, D. C.; Los Angeles; St. Louis; Detroit; Columbus, Ohio; and Massachusetts exclusive of Boston.

2. Based on convenient blocks of machine record cards. The totals in the top line of table 1 do not portray those of a typical division according to sex. Experience shows the following averages: men, 73.6%; women, 26.4%. These proportions applied to the figures on the bottom line of the table yield 3.9%, which represents typical low hemoglobin occurrence among white blood donors in both sexes.

3. Present minimum, 12.5 gm.

4. Phillips, R. A., and others: Copper Sulfate Method of Measuring the Specific Gravities of Whole Blood and Plasma, Bull. U. S. Army Med. Dept. (no. 71) pp. 66-83 (Dec.) 1943.

Obviously little meaning could be attached to the observed tendencies if the physicians on duty had subjected persons in the terminal age classes more than others to unusually careful questioning before accepting or rejecting them. Inquiry uncovered no intimation that such selectivity could have affected the reported figures in more than a very minor degree. Consequently, under the conditions specified for the subgroups (number of months between visits constant), the statistical findings seem plausible. Our demonstration that the host of factors governing the disqualifications included factors peculiarly associated with the ages of the women is consistent with published hemoglobin weights. The preponderant evidence in reports by Pett and Ogilvie,[5] the Medical Council of Great Britain,[6] Bryce and Jakobowicz,[7] and Howell [8] would indicate that the values are normally greater in women belonging to the age groups under 20 years and above 50 years than to other groups.

Another age phenomenon came to light in the form of a preliminary period upon the termination of which the determinations of low hemoglobin levels began to be comparatively less numerous. In regard to the women 21 through 59 years, aggregating 80.5% of the entire group,

TABLE 3.—*Distribution of Selected Women According to Age on Second Visit and Average Interval Between First and Second Visits*

Age (Years)	Number			Percentage	Average No. of Months Between Visits	
	Total	Disqualified	Accepted	Disqualified	Disqualified	Accepted
Under 21...	265	25	240	9.4	5.2	5.7
21-29.....	1,857	226	1,631	12.2	5.3	5.6
30-39.....	1,935	261	1,674	13.5	5.6	5.7
40-49.....	1,774	242	1,532	13.6	5.3	5.6
50-59.....	1,080	98	982	9.1	5.1	5.4
All ages....	6,911	852	6,059	12.3	5.4	5.6

this period averaged 5.8 to 6 months in duration from the dates of the initial blood donations; however, the women 50 years and older were not disqualified in lessening frequency until the stage of nondecline had lasted 7.4 months, whereas for those under 21 years it ended at only 5.2 months. The differences seem to reflect corresponding differences between the older and younger women with respect to the power of their bone marrow to regenerate erythrocytes. (Nothing said here is incompatible with a requirement that at least eight weeks must elapse between donations, and no person shall be accepted more than five times a year.[9])

After the expiration of the preliminary period the disqualification rates diminished in accordance with a lengthening interval to the second visit. The downward trend was noticeable when women of the same age were considered. Hence, the inference is forthcoming that the total causes of low hemoglobin levels embraced factors independent of age but definitely related to the passage of time to second visit. Toward the end of one year from the first visit the action of time influences weakened and relatively more women were then able to meet the prescribed hemoglobin test.

Left for brief mention is a supplementary group of 458 women who presented themselves 12 to 15 months subsequent to first donations. The low hemoglobin level disqualifications suggest that some women, up to 15.9%, psychologically hostile or feeling unequal to second contributions, eventually accede as a matter of civic duty. We know that so far as practicable many chapter recruitment committees seek out previous donors at the end of a year's nonreturn to the regional centers. The limited additional data suffice merely to raise the possibility that self-screening by the less physically able persons complicates the task of persuading previous women donors to maintain their support of the blood program.

SUMMARY

There are now in the United States an estimated 47 million women in the customary age range for blood donors, 18 through 59 years. Of that total, the number subject to being disqualified because of low hemoglobin levels may greatly exceed 6 million. Anemia is bound to be a subject of increasing medical interest if expansion of blood program operations should be continued, broader segments of the population included, and donor recruitment directed more intensely to women than at present. These comments result from a review of mass data collected by the American Red Cross.

Sample data on 239,191 white persons (165,408 men, 73,783 women) show that on their initial visits to donate blood at Red Cross regional centers or mobile unit operations 12.6% of the women (as compared to less than 1% of the men) were unable to meet a minimum requirement of 12.3 gm. of hemoglobin per 100 cc. of blood. A study of the records pertaining to a selected group of 6,911 women who had been successful donors on first visits revealed 12.3% rejected for the same reason on second visits made within a year thereafter. Statistical considerations indicate that the second visit disqualifications were related to the ages of the women, length of interval between the first and second visits, and other, undetermined factors.

The disqualifications were relatively more numerous during the most prevalent ages for child bearing and care and less numerous among younger women and those in their late forties and fifties. They were also fewer toward the end of one year from first visits than sooner; however, only upon the termination of a preliminary period averaging 5.9 months in duration were diminishing low hemoglobin levels in evidence. The exact point in time marking the beginning of the decline differed according to the women's ages, apparently reflecting a corresponding variation in the power of bone marrow to regenerate red cells of the blood.

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6. Haemoglobin Levels in Great Britain in 1943, Medical Research Council, Special Report Series, no. 252, London, His Majesty's Stationery Office, 1945.

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9. The American National Red Cross Blood Program: Medical-Technical Manual, no. 1702, Washington, D. C., American National Red Cross, rev. Feb., 1952, p. 1.

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CLINICAL NOTES

MULTIPLE ANEURYSMS OF THE RIGHT CORONARY ARTERY

DEATH FROM A RUPTURED ANEURYSM OF THE ABDOMINAL AORTA

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REPORT OF A CASE

B. F., a Jesuit priest 67 years of age, was brought by ambulance to the Loretto Hospital on Oct. 26, 1950. He complained of severe abdominal pain, which was most intense in the left lower quadrant. The pain was not relieved by an enema or by 1/6 grain (0.01 gm.) of morphine sulfate given hypodermically. A second similar injection of morphine given three hours later induced a brief fitful sleep. The patient awakened with pain in the abdomen and back and moaned and tossed in agony. He had been in the hospital only six hours in his terminal stage and was thought to have a mesenteric thrombosis.

The blood pressure was 190/110 on several readings and was in marked contrast to his usual pressure of 124/80. The lower pressure had been recorded on numerous occasions in the preceding six years and even while the patient had been hospitalized for coronary insufficiency and myocardial infarction.

The pain in the abdomen was difficult to evaluate, because of a history of so-called colitis. Various episodes of this condition had been self-medicated with cathartics and alkaline powders for many years. An especially severe abdominal pain five days before death had been so treated. This was at a time, in the last two weeks of October, 1950, when the patient had a variety of other symptoms. First hemiparesis occurred and was associated with dysarthria. The conditions developed over several days and resulted only in a minor disability in movement. They had improved to the point where the patient had resumed his duties just prior to his death.

A review of his personal history disclosed "rheumatic trouble" at 6 years of age, but details were lacking. There was hospitalization in 1939 for repair of a ruptured left quadriceps femoris muscle. This was incurred 14 months previously in a baseball game. At this time the heart had a normal rate and rhythm and all laboratory tests showed normal blood and urine.

Despite the good condition of the heart in 1939, the patient had a severe anginal attack in 1940. His condition improved after a 10 day stay in the hospital. The electrocardiogram showed some inversion of the T wave in lead 1. No repetition of the attack occurred for six years, and in the interval the patient resumed his duties as a religious instructor. His pulse was good, and his blood pressure was from 115 to 125 systolic and 70 to 80 diastolic.

In February, 1946, the patient had two attacks of angina pectoris. These were so severe that he recorded their occurrence distinctly at 10 a. m. and 1 p. m. The pain was in the chest at the level of the heart and radiated to each shoulder. Glyceryl trinitrate therapy relieved the pain. The electrocardiogram showed low-voltage QRS complexes, suggesting diffuse myocardial disease. The P-R interval at 0.20 suggested impending first degree auriculoventricular block. The diagnosis on discharge was arteriosclerotic heart disease and angina pectoris without coronary artery occlusion.

No similar episode occurred in the interval between February, 1946, and October, 1950, when the aforementioned abdominal symptoms occurred, and the patient was brought to the hospital for emergency treatment on the service of Dr. Francis Foran.

At autopsy, performed immediately after death, the following observations were made: The abdominal cavity contained 50 cc. of fresh blood from minute tears in the peritoneum near the left kidney. There was hemorrhage beneath the mesosigmoid close to its attachment to the posterior wall, and the blood extended laterally to the outermost edge of the left rectus muscle. The hemorrhage also extended retroperitoneally to the region of the left kidney and downward beneath the covering of the urinary bladder. In the region of the lower pole of the left kidney the hemorrhage extended to the right of the midline, across the duodenum, and into the mesentery for the small bowel for 8 cm.

The left adrenal gland was extensively dissected by hemorrhage, and some parts of the cortex resembled canary yellow islands of tissue in a sea of blood. The first impression was of an adrenal tumor in which a blasting type of hemorrhage had occurred. The origin of this huge extravasation was, however, in a saccular aneurysm of the aorta just proximal to the bifurcation. The aorta was dilated to a circumference of 12 cm. at this point, whereas above the dilation the greatest circumference was 7.2 cm. There was dissection under the lining of the aneurysm in a place 6 cm. in diameter and through an atheromatous patch 8 mm. thick. The splitting of the aortic layers proceeded circumferentially to a rupture through the adventitia and produced the hemorrhage already mentioned. The free blood in the retroperitoneal fat amounted to 1,500 cc. There was, in addition, at least 500 cc. of blood in the aortic wall, in the mesentery for the small bowel, and in the fat close to the left kidney.

The lungs were emphysematous anteriorly and subcrepitant dorsally. There were coal-pigmented nodules with gray fibrous centers, resembling arrested tubercles in the upper lobe and apex of the left lung. There was a similar nodule in the lower lobe of the right lung.

The root of the aorta had its lining altered about 50% by fatty and fibrous patches. This change increased gradually throughout the thoracic and abdominal portions of the aorta, so that at least 85% of the lining was involved at the bifurcation and in the common iliac arteries.

The heart weighed 465 gm. The outer wall of the left ventricle was 27 mm. thick, while that of the right ventricle was 5 mm. In many places 3 mm. of the latter measurement was due to fat. The circumferences of the heart valve rings were as follows: tricuspid 13.2 cm., pulmonic 7.4 cm., mitral 9.6 cm., and aortic 7.8 cm.

The coronary arteries were markedly tortuous, and the lining of the left was altered about 65% by fatty patches. The lumen was 11 mm. in circumference close to the mouth and was irregular but nowhere occluded. The right coronary artery was phenomenally altered. The mouth was 5 mm. in diameter. There were six aneurysms of this artery, all along the main descending branch. The first dilation had a calcified lining and was 8 mm. long and 11 mm. in diameter. It began 18 mm. from the artery mouth. The second aneurysm was centered 25 mm. from the first, was of the same size, and had about two-thirds of its lining covered with a partially organized blood clot. The third aneurysm was pouch-like, 6 mm. in diameter, and involved the outer aspect of the artery and almost all of the lining. With the exception of 10% of the left edge, the lining was covered with a stiff red clot, 1 mm. thick. The next aneurysm began 2 mm. more distally, was 18 mm. across, and had a clot obstructing both its entire lumen and that of the vessel on which it was situated. The clot was rubbery and dark red.

After a sclerotic course of 7 mm., the artery expanded into an aneurysm 2 cm. in diameter. This was filled with gray to pink grumous material, which resembled disintegrated clot with added fatty matter from an opened atheromatous region. After a straight interval of 5 mm., the last aneurysm was discovered. It was 7 mm. in diameter, and its lumen was filled with fresh red blood clots.

The myocardium of the apex of the left ventricle was scarred in one place 15 mm. in diameter. The lining of the left ventricle on its septal aspect contained eight white scars from 1 to 3 mm. broad and 7 to 12 mm. long. The outer wall of the left ventricle was extensively scarred by white patches from 1 to 5 mm. in diameter, especially in the central third.

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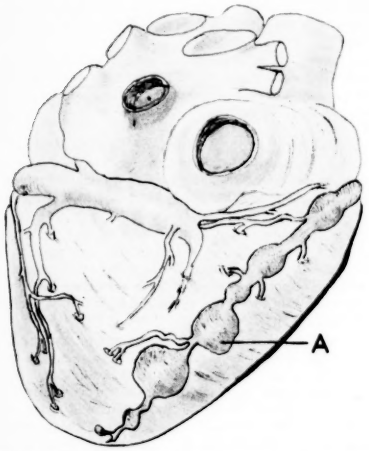
There was also an aneurysmal dilatation, 15 mm. in diameter, of the left common iliac artery 1 cm. distad to its mouth. The wall of the sac was sclerotic and as much as 7 mm. thick. The lining was partially dissected away by blood beneath it in a region 12 mm. in diameter. Here the detached lining was wrinkled. The other organs were remarkably free of changes other than sclerosis of the arteries. The spleen weighed only 75 gm., and its pulp was coarse and nearly bloodless.

Microscopic examination disclosed the following changes: The heart muscle cells showed hypertrophy and had moderate accumulations of polar liopochrome pigmentation. The scar tissue was, in general, old, but occasional sparse lymphocytic infiltrations were seen near the edges of the scars. There were also patches showing imperfect staining and haziness as is found in very early myocardial infarction.

Sections from the aortic aneurysm, whose dissection and rupture caused death, showed partial calcification in the atheromatous patch through which rupture occurred. The media showed the irregular track of dissection from the lining to the surrounding fat.



One (*A*) of six aneurysms of the right coronary artery. The heart is viewed from the back.

The aneurysm of the left common iliac artery showed a clot attached to the lining on its outer aspect. There was fresh hemorrhage into all layers of the artery wall. There was advanced sclerosis with partial calcification of the lining.

Sections of the aneurysms of the right coronary artery showed the changes typical of advanced senile sclerosis. There was extensive hyalinization of the media of the third aneurysm and acicular vacuolation indicative of cholesterol deposition. There was partial calcification of the lining.

The left adrenal gland had abundant hemorrhage into both cortex and medulla and into the surrounding fat. The cortical portions of the gland were dissected away from the capsule by hemorrhage in many places. In other regions there was indentation of the capsule from hemorrhage in the surrounding fat.

The prostate gland was involved in a benign hyperplasia of the left lateral lobe. This contained several well-circumscribed adenomas, in which there was papillary overgrowth of lining cells. There was also a slight interstitial lymphocytic infiltration close to the adenomas.

The anatomic diagnosis summarized the findings as follows: marked generalized senile arteriosclerosis; dissecting aneurysm of the abdominal part of the aorta; extensive hemorrhage into the retroperitoneal fat, urinary bladder wall, left adrenal gland, and mesentery for the small bowel; six aneurysms of the posterior coronary artery (several thrombosed); aneurysm with early dissection and clot formation of the left common iliac artery; benign prostatic hyperplasia; and scars of the knees (repair of quadriceps femoris tendons).

COMMENT

Rupture of an aneurysm of the aorta into the pericardial sac is occasionally recognized clinically. Tamponade of the heart by blood pumped into the pericardial sac causes rapid cardiac failure and death in most patients. The most frequent diagnosis is coronary thrombosis. The more gradual dissection through the wall of the aorta from the arch downward, either by rupture of a saccular aneurysm or by a true dissecting type, results in a perplexing series of symptoms. These are referable to the level of the aortic wall being split and are the result of a combination of factors. Chief among these are the disruption of the layers of the aortic wall by hemorrhage, the tamponing of aortic branches, the irritation of nerves in the vessel walls and involved organs, and ischemia of the organs. Patients so afflicted describe the onset of the sudden chest pain as gripping, pressing, squeezing, or "like a red hot poker" being pushed from the neck down through the chest.

In recent years the recognition of the true condition has led to a proper evaluation of the intense pleuritic pain, for example. This is due to dissection of the aorta by blood, which compresses the intercostal arteries especially in their course through the aortic wall. The intense pain in the various segments of the thorax is referable to the advancing thrust of blood within the layers of the aortic wall.

The speed of disruption is dependent on the blood pressure and on the resistance of the aortic layers primarily. The process may be temporarily halted if shock occurs; then the intramural blood may lose its driving force and clot. With the resumption of adequate pressure, the dissection may continue and encroach on any of the aortic branches. In this manner symptoms may occur that are ascribed to all the organ systems.

Death may not result from the first episode of dissection if it is slight. Again the patient's life may be spared if the column of intramural blood breaks through an atheromatous patch at one level in the aorta and, after a considerable distance, reestablishes contact with the aortic lumen. This condition may persist until a smoothly lined channel is formed in the aortic wall.

Dissection of this sort is not infrequent in saccular aneurysms of the abdominal aorta. Such was the condition in the case here reported. The bulging sac of the aneurysm was filled with a laminated thrombus in which there was extensive organization. Rupture of the aorta occurred in an atheromatous patch at the uppermost edge of the aneurysm. From this point the course was similar to that in a dissecting aneurysm, and death occurred in six hours.

The advanced sclerosis of the aortic branches was seen in the iliac arteries. On the left side this patient had an

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aneurysm in the common iliac artery 15 mm. in diameter. There was recent hemorrhage beneath the lining where dissection by blood had extended from the abdominal part of the aorta. Such aneurysms in themselves may lead to death.[1] In this patient it might have furnished the point of reentrance of blood into the vascular stream if death had not occurred so rapidly.

In addition to the aneurysms of the aorta and left common iliac artery, this patient had six aneurysms of the right coronary artery (see the accompanying figure). Their location on this artery and the condition of their lumens has already been detailed. Such aneurysms have been the subject of intensive study because of their rarity, their disputed causation, and their failure to produce typical symptoms.

Efforts by roentgenologists to demonstrate sclerotic cardiac coronary arteries in patients have been successful on numerous occasions. In 1927, Lenk [2] demonstrated calcified coronary arteries in the living by using the Potter-Bucky diaphragm. This was followed, in 1934, by a similar study by Wosika and Sosman.[3] They were able to show calcified coronary arteries in three patients. One of these subsequently was examined post mortem, so the clinical findings could be corroborated. More recently not only calcified coronary arteries but sclerotic changes in the heart valve rings have been reported by Koiransky and Ettman.[4] They also had corroboration of their findings at necropsy. Eventually coronary artery aneurysms may be found by such methods. In an article including a splendid review of the literature on coronary aneurysms, Scott [5] reported a globular shadow on the right heart border seen roentgenographically in his patient. At fluoroscopic examinations the shadow was seen to pulsate, and a diagnosis of probable aneurysm of the right auricle was made.

Scott made an exhaustive review and found 47 reported cases of coronary aneurysms since 1812. He classified these as diffuse and localized. The diffuse type apparently is on a congenital basis according to Harris,[6] Forbus,[7] and Rigdon and Vandergriff.[8] They develop in association with defects in the elastic lamella and muscular coats either at a branch or a bifurcation. The condition is similar to the changes noted in congenital aneurysms of the cerebral arteries.

The localized types have been divided as follows: congenital, 15; mycotic embolic, 12; syphilitic, 6; arteriosclerotic, 6; other types, 4; and unclassified, 4. In the 47 cases in which there was a localized aneurysm, the exact site was not specified in three. In the remaining 44, only the left coronary was involved in 27, and only the right in 11; there was involvement of both in six. Thirty-six bodies had single and eight had multiple aneurysms. In the group with congenital aneurysms, there were 14 male subjects and one female, ranging in age from 5 to 84 years. In the arteriosclerotic patients, four were men and one a woman. This group was from 58 to 77 years old. The mycotic-embolic group included six male and four female subjects, from 11 to 45 years of age. There were two additional cases in this group, but the sex was not stated. In the group with this type of aneurysm and the syphilitic variety there were 60% males, in marked contrast with the congenital variety, where males constituted 92.4% of the total.

The variety of alterations in this relatively small group of cases is fascinating. Prior to 1929, the most frequently reported cause of death from coronary aneurysm was rupture. Since that time coronary artery thrombosis and its sequelae have been most common. Not all patients died in a rapid or dramatic manner, however. Although three in the total series had chronic congestive heart failure, the general rule has been for these patients to present no symptoms referable to the heart.

The outstanding example of this fact was presented by Scott.[5] His patient, a man 84 years of age, died of carcinoma of the prostate gland and an ascending urinary infection. At autopsy his heart weighed 780 gm. There were 17 saccular aneurysms in an anomalous coronary artery circulation. The largest aneursysm was 10 by 8 by 8 cm. and was situated near the right auricle. This patient had an abnormal direct connection between the left coronary artery and an accessory right coronary artery. The vessel thus formed connected with the pulmonary artery. A person living to the age of 84 years with such a grotesque coronary circulation may serve as a natural experiment in altered blood flow to the heart. Venturesome surgeons are already furnishing new sources of blood supply to the heart by connecting a systemic artery to the coronary sinus.

Although the aneurysms of the coronary arteries usually produce no specific symptoms, many eventually cause death. Rarely does an aneurysm elsewhere in the body rupture and cause death in a patient who also has an aneurysm of a cardiac coronary artery. There is only one such case reported to date, by Manohar.[9] My case, as far as can be ascertained, is the second to be reported. The patient had six aneurysms of the right coronary artery, an aneurysm of the left common iliac artery, and a huge abdominal aortic aneurysm. The combination is unique for cases of the arteriosclerotic type of aneurysm.

SUMMARY

The literature on aneurysms of the cardiac coronary arteries is reviewed, and pertinent articles are cited. The clinical history and postmortem findings are reported in a case of multiple coronary aneurysms; the patient died of rupture, with dissection, of an arteriosclerotic aortic abdominal aneurysm.

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HEMOBILIA, CHOLECYSTITIS, AND GASTROINTESTINAL BLEEDING WITH RUPTURE OF LIVER

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Subcutaneous rupture of the liver is not a rarity. Our case is of particular interest on account of the complications of hemobilia, hemorrhagic cholecystitis, gastrointestinal bleeding, hemothorax, and hydropneumopericardium, with complete recovery. The over-all mortality from hepatic rupture in general remains about 60%, that from massive rupture being higher (60% to 80%).[1]

REPORT OF A CASE

R. G., 9 years of age, a white male child, sustained a severe injury to the abdomen and lower right portion of the chest at 5 p. m. on Feb. 9, 1951, when he fell from his sled into a jagged rock-filled creek. He was brought into the office 20 minutes later in a state of collapse. Shock therapy was immediately carried out with favorable response. X-rays were taken of the abdomen to determine the presence of air under the diaphragm and because of possible fracture of the ribs. The x-rays were all normal. His pulse rate was very slow (40 per minute). He moaned and complained of severe pain in the lower right part of the chest and right upper quadrant of the abdomen. Two central upper incisors were broken transversely in half. The diaphragm did not move with respiration, and there was a large ecchymotic area over the right upper abdominal quadrant. The abdomen was fixed, and peristalsis was not audible. A careful search of the head and spine did not reveal any evidence of trauma. Results of neurological examination disclosed no abnormalities; the eye grounds were normal. While the patient had reacted from the initial shock, the results of clinical survey and the severity of the trauma strongly suggested the possibility that a visceral injury and internal hemorrhage had occurred. The patient was thereupon transferred to the Mount Sinai Hospital.

Physical examination at the hospital revealed a rapid and feeble pulse, subnormal temperature, and cold clammy skin. Blood pressure was 80/30, and respirations were 30 per minute. The right side of the chest was fixed. The muscles of the right upper quadrant of the abdomen showed increased muscle resistance and absent reflexes.

The impression on admission was hemoperitoneum, probably due to a ruptured liver or spleen, with secondary shock and internal hemorrhage. He was given a transfusion of whole blood immediately, then glucose intravenously, a procaine penicillin G preparation (crysticillin®), vitamin K, and other vitamins. The blood cell count showed 62% hemoglobin (9 gm.), 20,850 white blood cells, and 33% hematocrit. The clinical evidence of hemorrhage clearly indicated the necessity of urgent surgery in an effort to locate the source of the bleeding.

Under general anesthesia, an upper right transverse abdominal incision transecting the right rectus sheath and muscle was used to open the abdomen. The peritoneal cavity was filled with bright red blood and clots, after the removal of which a thorough abdominal exploration disclosed a deep laceration of the posterior-inferior aspect of the right lobe of the liver, lateral and posterior to the gallbladder fossa and inferior vena cava. The hepatic area was sutured with surgical gut. The omentum was placed over and in the traumatized hepatic surface, being utilized as a cushion for the sutures. (Omentum acts as a valuable hemostatic and agglutinizing agent and must be sutured to the area of rupture.) Three pieces of gelfoam® (absorbable sponge) were also applied to the sutured site to further control hepatic bleeding. With the bleeding apparently controlled and the visceral injury repaired, the abdomen was closed in layers. The patient left the operating room in fair condition. He was given 750 cc. of whole blood and 250 cc. of 5% glucose by venoclysis during the operation.

On the first postoperative day, the abdomen was softer but peristalsis was still absent. A Levine tube was inserted to control vomiting and reduce gastric distention. Continuous Wangensteen suction was maintained. On the third postoperative day, fluid was found in the right pleural cavity. Hemoglobin was 73%. A transfusion of 250 cc. of whole blood was given. The temperature was sustained at 102 F. Tenderness at the site of his "cut down" in the ankle suggested the possibility of thrombophlebitis. He was treated with antibiotics, oxygen, and fluids given parenterally. X-ray studies showed that the right side of the diaphragm was fixed. It was difficult to determine at this time whether the fixed position of the diaphragm was the result of fluid in the pleural cavity or the beginning of a subphrenic collection. His fluid and electrolyte balance were maintained within normal limits.

On the sixth postoperative day, aspiration of the right pleural cavity yielded 450 cc. of brownish, bloody fluid. The aspirated pleural fluid showed xanthochromia. The right side of the diaphragm continued to be elevated. Persistent physical findings of fluid in the right pleural cavity required repeated aspirations.

Two weeks postoperatively, sharp pain developed in the right upper quadrant of the abdomen radiating to the right shoulder. Concomitant with the pain, vomiting of about 100 cc. of bright red blood and blood clots occurred. Blood pressure was 130/90 and pulse rate 96 per minute. Scleral jaundice and dark urine were evident. A gastrointestinal x-ray was normal.

The next day, the jaundice increased in intensity. The patient again vomited bright red blood and passed a tarry stool. Hemoglobin was 73%. The clinical picture suggested the presence of an acute duodenal ulcer resulting from the initial trauma. An ulcer regimen was instituted, with no subsequent clinical improvement. The pain in the right upper quadrant of the abdomen and hematemesis continued. The hemoglobin dropped to 60%. Frequent transfusions were given but to no avail. The development of a mass in the right upper abdominal quadrant and the patient's failure to respond to treatment prompted the decision to explore the abdomen again.

Accordingly, the patient was operated on 19 days after the first operation. Under general anesthesia, the abdomen was opened through the previous transverse incision. The abdominal cavity was dry, with no gross evidence of bleeding. The gallbladder was found to be acutely inflamed, distended to about six to eight times its normal size, and showed massive, diffuse mural edema. Insertion of a trochar into the gallbladder yielded thick blood clots and bile. A cholecystostomy was performed and a heavy rubber catheter inserted through the trochar opening in the gallbladder. Drainage continued satisfactorily from the cholecystostomy opening. Clinical improvement was immediately evident and continued to complete recovery. The drain from the gallbladder was removed after seven days. Several chest taps were performed, with the removal of slightly blood-tinged fluid. An x-ray of the chest six days after the second operation showed the presence of a small hydropneumopericardium on the right side at the level of the eighth dorsal segment. Since it did not cause any symptoms, it was allowed to absorb spontaneously.

The patient was discharged on March 10 (29 days after admission and 10 days after his second operation), in good condition. Follow-up x-rays two weeks after his discharge from the hospital revealed disappearance and absorption of the chest fluid.

The patient was last seen in January, 1952. He was healthy and active. Liver function tests showed normal hepatic function. A cholecystogram showed normal gallbladder function.

COMMENT

The interesting phases of this case were the occurrence of hemobilia, hemorrhagic cholecystitis, and gastrointestinal bleeding as complications of a ruptured liver. Hemobilia is a term suggested by Sandblom [2] to describe the symptom of bleeding into the biliary tree due to

From the Mount Sinai Hospital.

Dr. T. H. Mendell assisted in the management of the patient described.

1. Sanders, G. B.; Macguire, C. H., and Moore, R. H., Jr.: Massive Rupture of Liver, Am. J. Surg. **78**: 699 (Nov.) 1949.

2. Sandblom, P.: Hemorrhage into the Biliary Tract Following Trauma: "Traumatic Hemobilia," Surgery **24**: 571 (Sept.) 1948.

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trauma. His investigations reveal that this condition is rare. He described a 7-year-old boy who was hurt by the handlebar of a bicycle and who was operated on 10 days after the injury. A cholecystostomy with drainage was carried out for a distended gallbladder, the contents of the latter revealing bile mixed with blood. Opening of the gallbladder disclosed no definite bleeding site.

Siegel [3] (quoted by Sandblom) described a 32-year-old man who had sustained a blow from the handlebar of a bicycle. Several ribs on the right side were fractured, and bleeding into the right pleural cavity occurred. On the 10th day, the patient passed a blood clot via the bowel and felt better. On the 14th day he was operated on and a large distended gallbladder was found. There were several ruptures in the liver, varying up to 4 cm. in length. A spotty gangrenous gallbladder was removed and the gallbladder bed drained. Postoperatively there was considerable sanguineous drainage followed by the development of icterus. These were attributed to blood clots in the common duct. The patient gradually recovered without further complications.

Sandblom interpreted this case as one of hemobilia, the result of a central rupture of the liver, with the blood carried to the gallbladder through the biliary passages. He collected nine additional cases in which the source of the bleeding was attributed to probable rupture of the central portion of the liver.

Central rupture of the liver beginning in the center of the liver and extending to its periphery usually results from a compression type of trauma. Extension of a central hepatic rupture to or near the portal fissure may readily establish a communication between the vascular tree and one of the larger hepatic ducts. Thus, blood gains entrance into the duodenum and produces hematemesis and melena. The great danger of hepatic rupture is bleeding, particularly from the portal vein branches. The veins of the liver have little supporting tissue and do not tend to collapse. When mixed with bile, the blood shows little tendency to clot.

One cannot exclude the possibility that in our case the initial trauma of the liver was greater than suspected. The injury probably extended toward the portal fissure, where it communicated with the larger biliary ducts. It is conceivable that some of the blood could have drained through the hepatic duct into the cystic duct and remained in the gallbladder. The continued slow bleeding into the biliary tract was clinically masked by the numerous transfusions of whole blood. Two or more weeks elapsed before symptoms referable to this bleeding manifested themselves. By that time, the gallbladder was considerably distended, its walls thickened not unlike those observed in a cystic duct obstruction. The acute onset of jaundice is explained by the sudden blocking of the common duct by a blood clot or bile plug. The rapid disappearance of the jaundice suggests the clot was pushed into the duodenum, thereby opening the avenue for the normal escape of bile.

In further support of the concept that multiple hemorrhages through the biliary tract may stem from a central rupture of the liver is the case reported by Hawthorne and co-workers.[4] In this instance, the hemorrhage through the biliary tract was due to a cavity and a hematoma deep in the liver that continued to necrose and bleed through a large biliary duct until healing of the hepatic rupture occurred.

Additionally, our patient exhibited jaundice while his mother was recuperating from a severe form of infectious hepatitis. The child had last kissed his mother two months previously, when she was first admitted to the same hospital with a diagnosis of infectious hepatitis. The incubation period was well in line with the possible development of this disease in the child. However, subsequent liver function tests suggested an obstructive rather than hepatocellular jaundice.

SUMMARY

A case of ruptured liver complicated by hemobilia, traumatic hemorrhagic cholecystitis, gastrointestinal hemorrhage, hemothorax, and pneumohydropericardium with subsequent complete recovery is reported.

5217 Lebanon Ave. (31) (Dr. Epstein).

3. Siegel, E.: Ein Fall von traumatischer Gangrän der Gallenblase nebst einigen Bemerkungen über den Wert der Darmaufblähung zur Bestimmung der Lage von Unterleibstumoren, München med. Wchnschr. **56**: 341, 1909.

4. Hawthorne, H. R.; Oaks, W. W., and Neese, P. H.: Liver Injuries with a Case Report of Repeated Hemorrhages Through the Biliary Ducts, Surgery **9**: 358 (March) 1941.

INTUSSUSCEPTION OF THE VERMIFORM APPENDIX

REPORT OF A CASE

David B. Allman, M.D.
Milton Ackerman, M.D.
and
Harry S. Hoffman, M.D., Atlantic City

The first report in the literature on intussusception of the appendix was made by McKidd,[1] in 1858. His young patient died one month after he was first seen, without benefit of surgical treatment. The tremendous strides in surgery since then have established successful therapeutic measures, but preoperative diagnosis has lagged far behind. Rarely has a correct preoperative diagnosis been arrived at, although certain characteristics of the disease are definite enough to warrant its inclusion in the differential diagnosis of surgical disease of the abdomen.

The case reported here is of interest because of the type of intussusception; an invagination of the appendix into itself is rare, and only three previous cases have been reported. The fourth case of this type is reported with a brief discussion of the possible causative factors and a review of the literature.

REPORT OF A CASE

The patient, a 65-year-old white man, was admitted to Atlantic City Hospital June 30, 1951. He was first seen that morning, complaining of severe, cramp-like, intermittent pains in the lower right quadrant of the abdomen, lasting one to three minutes and recurring at intervals of one to two minutes. These had been present for 24 hours prior to admission to the hospital. There was no vomiting associated with the pain, although self-induced vomiting relieved the pain. These attacks had been

From the Department of Surgery (Dr. Allman, Surgical Director) and the Department of Laboratories (Dr. Ackerman, Director), Atlantic City Hospital.

similar and recurrent since 1949. At the insistence of his wife, he permitted a physician to see him, and immediate hospitalization was advised. Past history revealed that, in 1937, after sigmoidoscopy, an adenomatous polyp of the sigmoid colon was found and removed. There was no evidence of recurrence following this operation. In January, 1951, he consulted a gastroenterologist about abdominal, cramp-like pains of about two years' duration. There had been some slight weight loss. His general history, otherwise, was not remarkable. Physical examination failed to reveal any palpable portion of the colon. No masses could be felt. There was some slight increase in tympany throughout the abdomen, with occasional hyperperistaltic sounds. Results of rectal examination were negative. Sigmoidoscopic examination, for full distance of the 10-in. scope, disclosed only internal hemorrhoids. Examination with a barium enema showed only a spastic colon. Laboratory studies in January, 1951, showed a normal stool, blood cell count, blood sugar, and blood urea nitrogen and a negative Wassermann reaction.

The patient was pale and thin and did not appear ill. His pulse rate was 96, respirations 20, and temperature 99 F. His tongue and skin were dry. His abdominal wall showed no scars. There was slight distention. A sense of resistance was felt over the entire right side of the abdomen, most marked in the lateral area. No palpable masses were present, and the liver and spleen could not be felt. There was a definite area of tenderness pointing to the right costovertebral area. Results of rectal examination were negative.

Laboratory Data.—There were 16,200 white cells, with 60% segmented and 22% nonsegmented polymorphonuclear cells and 18% lymphocytes. The erythrocyte sedimentation rate was 30 mm. per hour. The blood urea nitrogen was 15 mg. per 100 cc. The urine contained acetone (2+) and a faint trace of albumin.

Course.—A preoperative diagnosis of acute suppurative appendicitis was made, and surgical procedures were instituted. With thiopental sodium anesthesia, laparotomy was performed, through a right rectus incision by one of us (D. B. A.). There was free fluid in the abdomen. The appendix was greatly thickened and shortened and appeared to be intussuscepted. The intussusception was not reduced, but the base was ligated and the appendix was removed by the retrograde method. Ten grams of a sulfonamide preparation was introduced into the abdominal cavity. Two Penrose drains were inserted and the abdomen closed.

Pathological Data.—The appendix measured 3.5 cm. in length and 2.5 cm. in its average diameter. The serosa was covered by a patchy, purulent exudate, and there were tabs of ragged, fibrous connective tissue adhering to it. The distal third was the intussusceptum and completely plugged the lumen of the middle third, or intussuscipiens. The wall of the proximal third was thickened; the mucosa of this portion was congested and its lumen narrowed. The intussuscipiens could be opened for only a short distance beyond the tip of the intussusceptum, beyond which point the two were fused. A cross section, distal to this point, showed a double-barreled structure with marked fibrous thickening of both walls.

Microscopic Examination.—A section of the appendix showed a double-barreled organ. The outer wall had an inner lining of flattened, congested mucosa. The submucosa and muscularis of this wall were broadened by a hyalinizing fibrosis and showed a light infiltrate of lymphocytes and a few polys. In the subserosa, there was capillary engorgement and a moderate polymorphonuclear infiltrate; a thin, fibrinopurulent exudate adhered to the serosa. The intussusceptum, occupying the lumen of this structure, showed a compressed mucosa and a hyalinizing fibrosis of the submucosa and muscularis with a sprinkling of lymphocytes and monocytes in the muscularis and subserosa.

Diagnosis.—The diagnosis was focal acute suppurative appendicitis due to intussusception of the vermiform appendix.

Postoperative Course.—The patient's course following operation was uneventful, and he was discharged from the hospital on the eighth postoperative day.

COMMENT

Less than 100 cases of intussusception of the appendix have been recorded in the literature since the first report of this condition was made by McKidd.[1] In 1941, McSwain [2] conducted a complete and thorough analysis of 77 cases and found the average age of the patients to be about 16 years; the youngest was 13 months, and the oldest was 75 years. He pointed out that the time lag between onset of symptoms and operation ranged from two hours to nine years.

Three types of intussusception of the appendix have been described by Szenes [3]: (1) invagination of the appendix into itself, (2) partial or complete invagination of the appendix into the cecum, and (3) compound intussusception wherein the intussuscepted appendix progresses distally into the colon, including the ileum. Of the total of 82 cases reviewed by Fraser,[4] the first type was present in 2 cases, the second in 44 cases, and the third in 32 cases. The remaining four cases were of intussusception of inverted appendiceal stumps.

The first case of invagination of the appendix into itself was published by Whitrow,[5] in 1930. The patient was a 12-year-old boy who was admitted to the hospital with a history typical of acute appendicitis of 18 hours' duration. At operation, the appendix was found to be the site of intussusception, the tip having invaginated itself until it lay at the base of the appendix. An appendectomy was performed, and the patient's recovery was uneventful.

The second case of intussusception of this type was reported by Fraser,[4] in 1943. His patient was a 75-year-old woman who had both intussusception of the appendix and carcinoma of the cecum. In this instance, the appendiceal intussusception was at the base of the appendix, where the walls were telescoped on themselves for ½ in. (1.3 cm.). The patient's symptoms were referable to the cancer of the large bowel, and the intussusception was observed incidentally.

The third case was reported in 1945 by Ingersoll and Meigs.[6] Their patient was a 45-year-old woman who had intussusception of the appendix with associated endometriosis in that organ.

The mortality rate found by McSwain [2] for intussusception of the compound type was 14.8%, while that of simple intussusception of the appendix was only 2.6%. In the compound type, the intussusception of the appendix will be masked and will not be apparent until the compound intussusception is reduced at operation or it will be discovered postoperatively when the resected specimen is examined. The extent to which the intussusception has progressed will depend on the length of time it has been allowed to persist.

Causation.—Many theories have been presented to explain the development of intussusception of the appendix. Wakley [7] suggested that hyperactive peristalsis

1. McKidd, J.: Case of Invagination of Caecum and Appendix, Edinburgh M. J. **4**: 793, 1859.
2. McSwain, B.: Intussusception of Appendix: Review of Literature and Report of a Case, South. M. J. **34**: 263-271 (March) 1941.
3. Szenes, A.: Invagination of Appendix, Arch. f. klin. Chir. **119**: 88-115 (July) 1922.
4. Fraser, K.: Intussusception of Appendix, Brit. J. Surg. **31**: 23-33 (July) 1943.
5. Whitrow, F.: Intussusception of Appendix, Brit. M. J. **2**: 181 (Aug.) 1930.
6. Ingersoll, F. M., and Meigs, J. V.: Intussusception of Vermiform Appendix: Report of Case, Arch. Surg. **51**: 172-173 (Oct.) 1945.
7. Wakley, C. P. G.: Intussusception of Appendix: Report of 2 Cases, Lancet **2**: 691 (Sept. 23) 1939.

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provoked by intestinal parasites or fecaliths may be responsible in some cases. He suggested, too, that the increased lymphoid tissue in the terminal ileum and appendix in young children acts as a foreign body and gives rise to increased and irregular peristalsis of bowel and appendix, which sometimes culminates in intussusception. MacDermott [8] conducted anatomic studies of the base of the appendix and found there a muscular sphincter. He thought the spasm of this sphincter would give rise to a hard mass at the base of the appendix, which would act as the apex of an intussusception. Fraser [4] found the cause of intussusception to be an inversion of the appendiceal stump in 4 patients in whom the appendix had been removed. McSwain,[2] likewise, noted this possibility and brought up for consideration the advisability of invaginating the stump of the appendix after an appendectomy. Ingersoll and Meigs [6] noted that the appendix is capable of rhythmic peristaltic contractions. These contractions, on encountering an area of inflammation within the wall of the appendix or an adherent concretion, result in a buckling inward of the mucosa, followed by the muscularis and serosa with the development of intussusception. If the base of the appendix is constricted and a foreign body or fecalith becomes impacted, the forceful peristaltic action of the appendix may carry that organ into the cecum. Previous inflammatory processes, such as acute appendicitis, may, therefore, set the stage for intussusception.

Symptoms.—McSwain [2] summarized the salient clinical manifestations of intussusception of the appendix as follows: The pain was generally intermittent, cramp-like, and paroxysmal, with complete relief at intervals. Nausea and vomiting almost universally accompanied the pain in 77 patients. Seventeen had blood in the stools. In the majority of patients, the bowels moved normally. There was only slight fever and slight increase in pulse rate or leukocyte count, except in patients in whom necrosis, gangrene, or peritonitis occurred. Distention occurred infrequently, and a mass was noted in 43 patients. There was little muscle spasm, and tenderness was not extreme.

The differentiation of acute appendicitis from intussusception of the appendix, unaccompanied by ileocolic intussusception, is difficult. McSwain [2] suggested the following points to aid in the differential diagnosis: (1) a history of more attacks than are usually seen in acute appendicitis; (2) more definitely cramp-like pains, similar to those of early intestinal obstruction; (3) a history of blood or mucus or both in stools, or their discovery on examination; (4) a history of palpation of a mass in the right lower abdominal quadrant; (5) less fever, increase in pulse rate, and leukocytosis than would be expected in a patient with an appendix inflamed enough to cause a clinical picture of equal severity.

SUMMARY

A case of invagination of the appendix into itself in a 65-year-old man is reported. Intussusception of the appendix into itself is rare, and only three cases have been reported previously. A review of the literature is included in the report.

26 S. Ohio Ave.

8. MacDermott, E. N.: Appendiceo-Caecal Intussusception, Brit. M. J. 1: 793-794 (May 9) 1931.

COUNCIL ON PHARMACY AND CHEMISTRY

REPORT TO THE COUNCIL

The Council has authorized publication of the following report from the Committee on Pesticides, a standing committee of the Council on Pharmacy and Chemistry.

R. T. Stormont, M.D., *Secretary.*

The following article is the fourth in a series of reports concerning pesticides of immediate medical interest. The Committee wishes to acknowledge the assistance of Drs. Robert W. Lackey and Joseph F. Treon, who reviewed the manuscript.

Bernard E. Conley, *Secretary*
Committee on Pesticides

PHARMACOLOGIC PROPERTIES OF TOXAPHENE, A CHLORINATED HYDROCARBON INSECTICIDE

Toxaphene is the accepted common name for a polychlor bicyclic terpene with insecticidal properties. It may be more properly identified as a chlorinated camphene with the average empirical formula $C_{10}H_{10}Cl_8$. The structural formula has not been definitely established since the chlorination of camphene may involve the addition or substitution of chlorine, a rearrangement of the molecule, or a combination of these reactions.

The technical or insecticidal grade is an amber-colored, waxy solid with a mild pine-like odor. It contains 67 to 69% chlorine and melts in the range 70 to 95 C. Although insoluble in water, toxaphene is readily soluble in inexpensive commercial solvents, especially those of an aromatic hydrocarbon nature. It is practically nonvolatile and has residual properties resembling those of DDT (dichloro-diphenyl-trichloro-ethane). Like other chlorinated hydrocarbons of this type, toxaphene slowly evolves hydrochloric acid when heated, the rate depending upon temperature and the presence of catalytic impurities, such as iron compounds. Strong alkalies and ultraviolet light cause a similar breakdown.

The insecticidal effectiveness of toxaphene is caused by combined contact and stomach poison effects. It is a relatively slow acting residual insecticide which is formulated for use as a dust, emulsion, spray, or wettable powder, and incorporated into bait for grasshopper control. Because of its slow action, paralytic agents such as iso-bornyl thiocyanoacetate are used in contact sprays to assure a rapid knockdown of insects. Toxaphene has been used extensively against cotton insects and for the control of grasshopper infestations. It also has been used as a supplement to, and substitute for, DDT for the control of insects resistant to DDT. Toxaphene sprays are not considered to be safe for household application, nor have acceptable medicinal uses for toxaphene been discovered. At one time it was believed to be comparable to DDT as a louse powder because of its persistence and resistance to laundering. Uncertainty as to its cutaneous toxicity in powder form precludes its use for this purpose. In medical entomology, however, it is proving to be a valuable agent for the control of the ticks and mites which transmit disease.

PHARMACOLOGY

Toxaphene is a general convulsant which acts on the central nervous system. It causes diffuse stimulation of the brain and spinal cord resulting in generalized convulsions of a tetanoid or clonic character. In this respect, it acts somewhat the same as DDT and certain other chlorinated hydrocarbon insecticides. Since toxaphene is a chlorinated camphene, it is suspected to have the medullary excitant effects of camphor. Such effects have been observed in several species of laboratory animals.

The occurrence of salivation, vomiting, and reflex excitability to sound suggests a generalized stimulation of medullary centers.

Stimulation of the vasomotor center, evidenced by the abrupt rise in blood pressure in the presence of complete muscular paralysis, occurs in curarized animals following intravenous doses of the compound. There are, however, no significant changes in mean arterial blood pressure following oral administration of toxaphene. This difference in response is probably accounted for on the basis of incomplete absorption of the toxicant from the gastrointestinal tract. The generalized epileptiform spasms which terminate in respiratory failure are also characteristic of a camphor-like compound.

Toxaphene apparently is absorbed irregularly, as a consistent range of toxicity has not been noted in experimental animals. Absorption occurs from the alimentary tract, respiratory tract, or skin, and is partially influenced by the physical state of the technical product. In solution, toxaphene is readily taken up; in the solid form, it is absorbed in toxic amounts depending on the species of animal and the concentration of the powder (dust) used. For example, cutaneous exposure to the 40% technical dust proved to be lethal for rabbits, although higher concentrations applied to the skin of dogs were well tolerated.

Little is known about the distribution, storage, detoxification, and excretion of the compound. The lack of suitable microanalytical chemical methods for the positive identification of minute quantities of toxaphene in tissues or body fluids prevents an accurate determination of its metabolic fate. The high lipoid solubility possessed by this substance suggests that it is probably distributed throughout the various fat depots of the body. Determination of the chlorine content of brain tissue from chronically poisoned dogs indicated storage of the compound as a chlorinated derivative, although the organic chloride content of body fat was not significantly altered. With steers which had been similarly exposed, however, the amount stored in fat tissue was one to three times the amount ingested over a given period.

Toxaphene is believed to be slowly detoxified in the liver. This assumption is based on two observed characteristics; namely, its close chemical relationship to camphor, which is known to be detoxified in the liver, and the isolation of ethereal sulfate and glucuronic acid conjugates of toxaphene in the urine. Toxaphene is also excreted in milk.

TOXICOLOGY

Toxaphene has an irregular toxicity range which basically is due to the vagaries of the absorptive mechanisms in the various animal species. It is toxic by inhalation, ingestion, or skin contact in all forms, but the route of administration and the form in which it is available materially alter the degree of toxicity.

Wide variation in susceptibility has been noted among animals of the same species as well as among those of different species. Dogs are the least tolerant mammals to orally administered toxaphene, followed in an increasing order of resistance by cats, rabbits, rats, guinea pigs, and the larger domesticated animals. This pattern of susceptibility generally is similar to that of most chlorinated hydrocarbon insecticides with two exceptions. Birds, as a group, are not resistant to the compound, having a toxicity range comparable to that for the smaller laboratory animals (50 to 200 mg. per kg. of body weight). Conversely, toxaphene is much more toxic to fish than most other compounds in its class. In this respect it is as toxic as, or more toxic than, rotenone. For this reason, it has been suggested as a useful substitute for the plant insecticide in fish-management work.

The oral toxicity of toxaphene places it among the more toxic of the commercially available chlorinated hydrocarbon insecticides which are acutely poisonous by this route of administration. The oral $L.D._{50}$ ranges from 15 to 375 mg. per kg. of body weight depending on the species of animal and formulation employed, while the intravenous $L.D._{50}$ lies between 10 and 15 mg. per kg. of body weight. This wide variation is believed to be indicative of the irregularities in intestinal absorption which may be expected among most animal species. Since a similar variation among animals exists with orally administered DDT, estimations indicating that toxaphene is approximately four times as acutely toxic as DDT are valid. The fatal dose for man has been estimated to be 2 to 7 gm. Three human fatalities and eight cases of nonfatal poisoning from the accidental ingestion of toxaphene preparations and residual amounts of the technical material alone and on edible crops are reported elsewhere in this issue of THE JOURNAL (see page 1124).

The chronic toxicity of toxaphene for rats is less than that of DDT, being closer to that of lindane. Dogs are particularly susceptible to small amounts of toxaphene given repeatedly over long periods of time, while other animals similarly exposed appear to have a somewhat greater tolerance, especially in the lower dosage ranges. Gross injurious effects, such as retardation of growth, greater incidence of mortality, increased size of vital organs, loss of appetite, and occasionally other signs of chronic poisoning are evident in rats after repetitive feedings of toxaphene at a level of 100 ppm for a period of two years. Cumulative effects of poisoning in dogs, however, are noted at much lower levels of toxaphene in the diet. These variations in response among animal species coupled with the inadequacy of behavior and changes in appearance as criteria of chronic injury make it difficult to interpret laboratory data in terms of human hazard. For these reasons, histopathologic studies are being relied upon increasingly to measure the chronic toxic effects of chemicals. On the basis of such evaluations of chronic toxicity, toxaphene has been found to compare favorably with many of the chlorinated hydrocarbon and metallic insecticides, although less so in comparison with most of the botanical insecticides and the remaining synthetic insect control chemicals in common use.

In laboratory animals toxaphene in concentrated form is reported to be a mild to moderate skin irritant. A conventional patch test of human subjects yielded no evidence of irritation or sensitization. Irritation of the eyes, nasal mucosa, and throat has been reported in persons exposed to toxaphene dusts and sprays. These manifestations are believed to be caused primarily by the diluent or solvent used in the formulations.

Systemic effects may be induced by absorption of toxaphene through the skin in dry form and in solution. Absorption through abraded skin surfaces is the most rapid. Dry formulations of the insecticide are the most variable in this respect and skin hazards are dependent on several factors. The rate and extent of cutaneous absorption of such preparations depend on the concentration and extent of exposure, the presence of wetting agents (as used in wettable powders), and the susceptibility of animal species. High concentrations of dusts (50%) do not elicit symptoms in dogs, although lesser concentrations are lethal to rabbits. Wettable powder preparations have provoked symptoms in cattle, although to a lesser degree than oil solutions. Oil formulations and emulsive forms of the chemical are readily absorbed through the skin and are the most dangerous. A rapid vat-side test for assaying the amount of toxaphene in cattle dips has been developed which allows the use of dip solutions without running the risk of serious injury to the animal. It is not recommended for use on dairy cattle or in dairy barns because of the danger of milk contamination.

When it enters the respiratory tract toxaphene is potentially toxic, especially in solution. Erratic results were obtained in the available animal studies on this phase of its toxicity. Forty, 100, and 60% mortalities were obtained in groups of mice exposed to oil-based mists of toxaphene in a concentration of 0.2 mg. per 100 cc. of air per minute for 112, 116, and 158 minutes, respectively. On the basis of this test, the $L.C._{50}$ for mice is 0.2 mg. per 100 cc. of air per minute for a two-hour exposure period. Absence of significant consolidation in the lungs suggests that death was primarily caused by toxaphene. Field studies of

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livestock exposed to toxaphene solutions used as cattle dips indicate that the insecticide may be toxic both cutaneously and by inhalation, especially to the young of the species. Autopsy of calves dipped in toxaphene solutions showed lung involvement which was attributed to the dip solution.

Gross pathologic changes are uncommon in either acute or chronic toxaphene poisoning. Histologic studies of chronically poisoned animals revealed degenerative changes in the renal tubules and liver parenchyma. The latter are characterized by centrolobular hypertrophy of the hepatic cells which may progress to central necrosis and reparative hypertrophy. The brain, heart, lungs, skeletal muscles, adrenals, pancreas, stomach, small and large intestines, and spleen were uninjured.

Symptoms which may be anticipated in human poisoning from toxaphene are those of a convulsant drug affecting the brain and spinal cord. Generalized epileptiform convulsions are the most prominent features in acutely intoxicated animals and may be expected in human counterparts. Salivation is usually the first sign of toxicity in animals. This is followed by emesis, which is believed to be caused by direct stimulation of the emetic center. Shortly after the onset of vomiting, intermittent muscle spasms develop. These are followed by generalized convulsions at three- to five-minute intervals. Convulsions become progressively more frequent until finally a convulsive state exists which terminates in exhaustion and death from respiratory failure. The onset of symptoms usually occurs in one hour, although symptoms may be delayed as long as three or more hours after an oral toxic dose. Death occurs in four to eight hours or may be deferred up to 24 hours.

The treatment of toxaphene poisoning is directed toward the evacuation of the stomach and bowels and control of convulsions and other central nervous system manifestations. Gastric lavage and saline cathartics are the accepted measures for the removal of ingested insecticide. Toxaphene-induced convulsions in experimental animals seem to be controlled with greater ease when this practice is followed. This is probably because of the great affinity for lipoid substances and the negligible water solubility which is characteristic of toxaphene and other chlorinated hydrocarbon insecticides. Oily cathartics and fatty substances are usually contraindicated because of their capacity to increase absorption of the toxicant. Prompt removal of the oil-solubilized insecticide before passage into the intestines, however, reduces the chance for absorption of appreciable amounts of the toxicant.

A variety of drugs have been tried for the control of toxaphene convulsions. These include morphine, paraldehyde, methadone, dilantin,® tridione ® with urethane, the sodium salts of amytal,® pentobarbital, and phenobarbital. All were given intravenously except paraldehyde, which was given intramuscularly, orally, and rectally. Morphine, methadone, and tridione ® with urethane were found to be ineffective in experimental animals. Paraldehyde effectively controlled convulsions when given in large doses intramuscularly but produced sloughs. It was less effective by stomach and by rectum. Dilantin,® when given with small amounts of phenobarbital, was effective when given early but it was ineffective for recurrent convulsions after an initial dose of phenobarbital.

All of the barbiturates used were effective in controlling convulsions. When treatment is instituted before the onset of convulsions, long acting depressants, such as phenobarbital sodium, are the drugs of choice. If convulsions develop prior to treatment, short acting barbiturates, such as pentobarbital sodium, are considered to be more effective, since a full anesthetic dose of the drug can be given if necessary. Experience with animals indicates, however, that convulsions can be most readily controlled if treatment is begun before their appearance. Once convulsive seizures occur it is advantageous to build up the dosage of the drug as rapidly as possible to a level sufficient for control, since the longer convulsions persist the more difficult they are to control.

REPORT TO THE COUNCIL

The Council has authorized publication of the following report from the Committee on Research, a standing committee of the Council on Pharmacy and Chemistry.

R. T. STORMONT, M.D., *Secretary.*

Physicians often are disconcerted by premature or sensational announcements of medical discoveries appearing in the lay press long before any authoritative information on the subject is published in a reputable medical journal. The professional resentment aroused is frequently directed against the investigators whose names are mentioned in the news release. As a rule, the investigators are not directly responsible for the appearance of the story in the national press.

The enormous interest of the public in any item concerning medical progress results in thorough coverage of the scientific meeting of any large medical society by newspaper reporters free to attend such sessions. What the reporter considers newsworthy and interesting he prints with names, pictures, and his own interpretation of the story. This is his inherent right as expressed and guaranteed in the term "freedom of the press." Nevertheless, it would seem advisable for science writers to check over the facts contained in their stories with the investigators. The latter invariably are willing to correct errors or misinterpretations of their reports in the interest of the reading public. Undue haste in publication may result in harm to both the laity and the writer's reputation for accuracy.

Another source of news stories apparently emanates from public relations counsels employed by some pharmaceutical firms to place items concerning new drugs in the newspapers. In this the public relations counsel is merely carrying out his client's wishes. The firm, however, has recognized the commercial advantage in creating a demand by the public for a new and untried drug or for a new and scantily documented use for an older drug. By such publicity the firm apparently hopes to avoid the long but necessary period of evaluation for a new method of treatment. Following publication of these planted items, the public is quick to press the profession for employment of newly mentioned drugs or uses and shows little sympathy or understanding for the reluctance and resistance of physicians to accept such publicity as evidence of therapeutic worth. There is no denying that the wisdom of releasing some of the information disseminated in newspapers and periodicals, and on radio and television, is open to question.

The concern expressed by research investigators and practicing physicians regarding the detrimental effect of many of these press releases on physician-patient relationships indicates a need to clarify the situation for the profession and to suggest means which might aid in avoiding unpleasant premature release of information.

The following article on this subject has been reviewed and approved by the Committee on Research.

PAUL L. WERMER, M.D., *Secretary, Committee on Research.*

DOCTOR, MEET THE PRESS!

John L. Bach, Chicago

Times have changed in the field of medical science reporting since Osler uttered this caution: "Believe nothing that you see in the newspapers—they have done more to create dissatisfaction than all other agencies. If you see anything in them that you know is true, begin to doubt it at once."

The medical profession's attitude toward newspaper reporters has changed from definite coolness to warm and friendly cooperation, especially since World War I.

More doctors are meeting more reporters today than ever before with the result that there is more and more news about medicine and health in newspapers and magazines and on the radio. This reflects a strong desire by the public for knowledge of the progress of medical science. Independent newspaper and press association surveys have shown that there is more reader interest in medical news than in any other branch of science.

Director of Press Relations, American Medical Association.

Therefore, the average doctor, whether general practitioner or specialist, can expect sooner or later to meet the press. It may happen while he is busy in his office or walking up the steps of the hospital or addressing a medical meeting or entertaining socially or speaking at a luncheon club. It may happen suddenly when a prominent patient dies or when the doctor plays a part in the development of a new drug.

Many physicians like to think that they meet reporters, or highly trained science writers, on a basis of equality, with the best of good will. How the doctor handles himself to meet these extraordinary situations can spell either success or failure. While medical press relations have improved tremendously during the last few years, it is still surprising how often specific encounters between physicians and science writers result in disappointment or annoyance on one side or both.

This can be blamed on the complicated aspects of both writing and reading news of scientific discoveries in medicine.

As Dr. Alan Gregg, director of the Rockefeller Foundation, said in one of his speeches not long ago: "The issue of what a discovery may eventually mean injects a tremendous emotional strain. The possible meaning of a discovery affects the investigator, the news writer, the medical profession, the anxious patient, and the news reader—each in a different way.

"The investigator's ambition to have accomplished something of undisputed and permanent value, as well as scientific soundness, is quickened—to put it rather mildly. The news writer suffers from the temptation to play up undeniable but unlikely possibilities of the discovery. The medical profession, with a long experience both of bitterly disappointing flashes-in-the-pan and almost miraculous conquests of disease, eagerly awaits confirmation and application of the new fact. The anxious patient and his family experience the anguish of uncertainty and the all but intolerable vacillation between incredulous despair and new renewed hope. Even the question of patents and proprietary control may be involved. Everyone is disturbed."

With such a tense and complicated background to the release of news of advances in medical science, both the writer and the doctor who becomes associated with an important announcement are faced with certain moral obligations.

William M. Pinkerton, director of the Harvard News Service and a newspaperman for more than a decade, once wrote an excellent piece in the Harvard Business Review on the attitudes of the public toward the press. He said that busy executives—and that includes doctors—often complain that:

"The papers never get things right." "You can't trust reporters." "They didn't put in half of what I told them." "They missed the whole point of the story." "I didn't say that at all."

The truth is, Mr. Pinkerton said, that most of the time newspapers do get things right; you can trust most reporters; they do have the space for good news; one man's point is another man's side issue; occasionally someone is misquoted, but often the real trouble is surprise at the naked look of the spoken word in print.

Why do such situations arise? The simple fact is that most of the misunderstanding, when there is misunderstanding, arises because few physicians know how reporters work or what makes them tick.

The doctor often believes that he knows all about newspapers and can determine for himself what they should say and exactly how they should say it. In reality, newspaper writing today, whether it is medical news or the reporting of a big fire, is an exacting business—as exacting as removing a gallbladder or prescribing a drug for a pain in the stomach. It is a highly competitive business. The people who run a newspaper are as well trained for their specific jobs as the doctor is in his field. Like some physicians, many consider themselves specialists in their own writing sphere. That is why newspapers have medical science writers, financial writers, sports writers, editorial writers, and outdoor editors. Each of these has special talents which he applies in his work and, over the years, becomes recognized as a specialist in a certain field or a branch of the newspaper business.

One important point to remember is that all of these writers work for an institution or business whose freedom is guaranteed under the Constitution of the United States and all of the state constitutions. Under such guaranties, the press stands by common consent first among the organs of public opinion.

Remember, too, that a reporter never stands alone. "A reporter's stake in a story is shared by his editors," said Mr. Pinkerton. "If he is pushed around and left cooling his heels in an outer office, his grievance may well become their grievance, too. No matter how hard an editor may strive to handle the news impartially or without bias, the 'bad' news source is sometimes in danger of suffering in print for his 'acts.' And the 'good' news source is likely to benefit in the long run."

A reporter's job is to report news accurately and impartially and if he is working on a medical story, for example, he naturally turns to a doctor for the facts. He should turn to the medical profession for his information because presumably it is the best informed and should always be considered the most authoritative source. A reporter is not expected to mold the results to some pre-conceived notion—yours or his.

The facts about American medicine and the health of the American people have to be told by those who know the facts. If the reporter cannot get the facts from you, the doctor, he will go elsewhere and your chances and the chances of the medical profession, generally, of getting an accurate story before the public may be lost.

"Physicians must realize that what the public knows and how the public feels toward the profession depends largely upon where it gets its information," said C. Lincoln Williston, Manager of the University of Illinois' Office of Public Information, adding: "If physicians and medical societies do not facilitate the publicizing of the authentic information which they possess, they then must accept the blame for public ignorance and public misunderstanding.

"The fact must be recognized that, no matter what physicians and scientists might accomplish, newspapers, magazines, radio and television are going to report on subjects currently within the realm of medicine. The choice then is not between publicity and no publicity. Rather, it is the choice between authentic news reports prepared with the active cooperation of physicians on the one hand, and 'black market' publicity of questionable accuracy on the other."

Someone once said that if doctors, especially research men whose business is the accumulation of knowledge, do not accept their educational responsibilities, they will have abdicated in favor of ignorance.

The framers of the "Principles of Medical Ethics of the American Medical Association" must have had this thought in mind when they drafted the following section:

"Many people, literate and well educated, do not possess a special knowledge of medicine. Medical books and journals are not easily accessible or readily understandable.

"The medical profession considers it ethical for a physician to meet the request of a component or constituent medical society to write, act or speak for general readers or audiences. The adaptability of medical material for presentation to the public may be perceived first by publishers, motion picture producers or radio officials. These may offer to the physician opportunity to release to the public some article, exhibit or drawing. Refusal to release the material may be considered a refusal to perform a public service, yet compliance may bring the charge of self-seeking or solicitation. In such circumstances the physician should be guided by the decision of official agencies established through component and constituent medical organizations.

"A physician who desires to know whether, ethically, he may engage in a project aimed at health education of the public should request the approval of the designated officer or committee of his county medical society." In order for a physician to comply with the last statement, it is imperative that every state and county medical society have an active press relations committee, empowered to speak, which can serve effectively as the liaison between physicians and the press, magazines, radio or television.

Recognizing the importance of full cooperation between physicians and the press, many of the state and county societies have adopted a Code of Cooperation, setting forth a workable policy on medical news which would satisfy both sides.

The Colorado State Medical Society's Code, which has served as a model for Codes adopted in many of the other states, sets up a system of official spokesmen for each county society—usually the president, secretary and publicity chairman. These men and women, as well as the spokesman for the hospitals,

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are to make themselves available to the press and may be quoted "in matters of public interest for purposes of authenticating information." The Code states specifically that this action by the spokesmen "shall not be considered by their colleagues as a breach of the time-honored practice of physicians to avoid personal publicity, since it is done in the best interests of the public and the profession."

The Colorado Code and the Codes in effect in many of the other states are a tremendously encouraging sign that the physicians and the press are alive to the importance of giving accurate medical information to the public. The Codes, however, should be drafted cooperatively between the press and medical societies; they should never be drafted by the medical society alone.

A doctor or medical researcher, in order to make his job of meeting the press easier and, at the same time, stay within the bounds of good ethics, should call upon such a committee of his state or county society for help in working out publicity problems. In most states, the publicity committee is guided in its work by experienced public relations people, most of whom are former newspapermen. The job which these committees are doing, and have done, is of great import to the medical profession as a whole.

But the Codes in themselves do not provide all the answers to publicity problems on a local or national level. Their effectiveness rests on whether the publicity committee is an active one or a dead one. An active committee, really interested in the day-to-day problems that come up, will do a good job, while an inactive committee, one in name only, will do a poor job which will show up continually in bad public relations for the profession.

National medical organizations, especially the specialty groups, and at least the larger state societies, should by all means set up the physical mechanics for doing a good press relations job at their annual meetings. Sometimes bad publicity emanates from national meetings and this bad publicity usually can be traced to poor press relations on the part of the medical organization. The blame cannot be laid on the press alone.

The job of handling press relations at a national meeting requires, above all things, experienced personnel fully familiar with both the doctor's viewpoint and that of the press. The experienced press representative can save the doctor many a headache. Physicians who specialize more or less in research are often invited to appear on a program of a national organization. But, at times, they are almost reluctant to give information to their fellow physicians because they fear that a garbled story might appear in the newspapers, resulting in ridicule by their colleagues because of the consequent publicity. This is a pertinent point in the whole realm of medical press relations. But there is more to it than that. Even if a news story is 100% accurate, physicians will frequently deride their colleagues who figure in a story with such a jibe as: "I saw your advertisement in the paper today." Such a statement, good natured or not, makes the conscientious physician, who is trying to help the profession, quite reluctant to be a part of any future stories. This hurts medicine!

It is much easier for everybody concerned if the doctor can consult in advance with the press representative who has been empowered by the national organization to handle its press job.

In cases where no such representative is available at a national meeting, it is best for the doctor to consult or work with the public relations director of the medical society located in the city where the meeting is being held. In all probability this man is well acquainted with the newspaper contacts in that city and can be of invaluable help to the visiting doctor.

Several national specialty organizations still adhere to the time-honored custom of mimeographing in advance the full papers which doctors are scheduled to deliver at a meeting. This is a good and bad practice—depending on the way a newspaperman and a doctor look at the service from their own individual standpoints.

Some writers who devote their full time to science and medicine, prefer the full texts; the more the better. Other writers, especially those on newspapers, prefer to work from good abstracts of the papers because they do not have the time to review the full texts of all papers.

The majority of writers, however, would prefer to work from abstracts carrying interpretive scientific facts, definitions and background. "If a doctor's contribution is an important and interesting one," a prominent writer told me, "nothing takes the place of a full text." He was of the opinion that many of the inaccuracies in a story resulted because a reporter, working from an abstract only, tried to fill in the gaps himself.

For any medical organization to adopt a policy of automatically mimeographing all papers in full is the laziest way of handling a press relations job. But it does not help the physician who prepared his paper with only a medical audience in mind. The doctor may be discussing a subject based on only a handful of cases; yet his experimental research may be important enough to present to the medical meeting even though he knows it is "premature" in every sense of the word. In such a case, the physician is presenting his facts to his colleagues only and not to the public. For any organization to follow a general practice of mimeographing such a paper and passing it on to writers, without first weighing its impact on lay readers, is to do a disservice not only to the doctor who was invited to deliver the paper, but to the medical profession and the public as well.

Whether to provide a full text or an abstract only is best determined by the common sense and good judgment of an experienced person, who carries the responsibility of handling the press relations for a medical organization.

Abstracting of medical material for publicity purposes only should be the responsibility of the national or state organization if they are interested in doing a good press relations job. By having an experienced medical press writer abstract the papers in advance in newspaper phraseology, the organization is, almost automatically, assured more accuracy when the final story appears in print. By the same token, the doctor who is involved in the story often avoids embarrassment by having his facts appear in public print correctly.

A physician who is a party to an important announcement, not necessarily given at a national or state convention, should in the best interest of ethics seek the advice of the publicity committee of his local medical society well in advance. In addition, he should seek the advice and help of a press writer experienced in the medical field who can aid him immeasurably in presenting his case to the publicity committee. Then, if the committee grants its approval, the writer also can help the physician to prepare a proper press release. The extra effort which the physician exerts in advance will pay off in a more accurate story—a story he can proudly and properly endorse.

Since he usually lacks experience in preparing or presenting facts for lay consumption, a doctor should rarely prepare his own news release. This is true especially with statements pertaining to cancer, poliomyelitis, heart disease, arthritis, and asthma. The public is vitally interested in these subjects and news stories dealing with them should be carefully handled so that they do not imply that a cure has been found unless, of course, the word "cure" with all its full meaning is actually involved.

In reporting drugs for the treatment of some of these diseases, pharmaceutical firms are often censured by members of the medical profession, who charge, among other things, that the announcement is premature. The highly ethical drug firms are seldom responsible. Most of the time they leave no stone unturned in trying to keep a premature story out of print. Many times they fail because the news leaks out from a wholly unsuspected source. Then, again, there are less reputable firms which rush into print with the most flimsy reports based on few, if any, scientific facts or on articles "in press" and therefore unavailable to the physician to enable him to make an independent appraisal of the worth of the drug. These bad reports offset the really good reports.

Some physicians seem to feel that nothing should be said in the public press about a new therapeutic agent until it has been "fully proved." But when is a drug "fully proved?"

Mr. Steven M. Spencer, popular medical editor of *The Saturday Evening Post*, discussed the matter of "premature" publicity in a fairly recent article in *New York Medicine*. He said:

"We know that very few contributions represent immortal and immutable medical truths. But that does not mean they are not worthwhile contributions, capable of giving valuable aid until something better comes along. Sulfanilamide was not without its untoward side effects, and ultimately it was largely replaced by

other, better chemotherapeutics. Yet in the meantime it saved many lives and prevented much suffering. Would those who charge the press with being 'premature' in its reports have denied the public information about sulfanilamide simply because it had some drawbacks?

"No informed person expects science to move forward at a steady, unchanging pace. It is inevitable that medicine may occasionally take three steps upward and then find it must back down one step to secure a firmer foothold—but it has made a net gain of two steps. Surely the public is entitled to witness this progress, no matter how irregular and interrupted it may be. It is the science writers' contention that the public should learn of new developments touching on its health just as soon as a number of qualified physicians feel that the developments have promise and that they have been *tried out sufficiently to justify continued use*. Those who are ill need all the hope and encouragement they can find, and they find a great deal in the good news of medicine's accomplishments. The disease which a patient is suffering may be incurable today, but his faith in medical science may help sustain him until the arrival of tomorrow's successful treatment."

A few physicians like to represent themselves as knowing everything there is to know about medicine, and they are quick to criticize any newspaper announcement about a drug or technic unknown to them. A moment's reflection will show that such a position is indefensible because the diversity of specialties in medicine is so great today that no one can assume he knows everything about all of them.

Consequently, to the patient inquiring about a new drug reported in the press but not yet in a medical journal, the physician might say something like this: "It's new and I hope what I read in the paper, too, is true. I haven't seen anything about the drug in the medical literature, but I'll do some checking and try to appraise it in your particular case. Please give me a little time and I'll see if it is a safe treatment for you."

The patient will appreciate the doctor's position and will respect his attempt to exercise his own personal judgment in evaluating the drug for the patient's use. There is certainly nothing embarrassing in such an explanation.

The careful reporter often qualifies his story by warning of dangers and short supply of a new substance or insufficient evidence. Physicians should look over the published story rather carefully and use such qualifications to calm the patient who calls.

Another bugaboo to an accredited medical science writer is the doctor's reticence at seeing his name in the public print. He prefers to stick by the tradition of hiding his light under the proverbial bushel labeled "Don't quote me."

Again Mr. Spencer says: "Our argument for using names is simply that we believe the public has a right to know whose work is being described and whose opinions are reflected in the text of the article. To adopt a policy of not quoting authorities would open the way for unreliable reports on medicine by irresponsible publications—and there are a few. In addition, we feel the story of medicine's advance is the story of people as well as of facts."

Some doctors who protest against the use of their names in a news story claim that such publication amounts to personal glorification and advertising and that this type of publicity can become a device whereby charlatans promote their own trade.

Many doctors would prefer to remain anonymous, but Lester Grant, former science editor for the *New York Herald Tribune* and now a medical student at Harvard, believes this is really a dangerous line of thinking. "A doctor's name in a story," he said, "is some protection for the public; at least, it's a check against careless reporting. Without having to worry about where he got his information, the reporter might be led to the following fantasy: 'A cure for cancer has been discovered, it was learned last night. This cure involves the drinking of a quart of water a day, elimination of pepper from the diet, and strict bed rest for 19 years.' If a doctor protests against the spreading of such nonsense and demands to know the source of the information, the writer might stand on his professional ethics, so called, and refuse to give the name of his informant. Such hyperbole may seem out of reach, even of some of the less responsible newspapers, but one has only to track down the sources of some of those 'reliable' reports coming from 'well informed spokesmen' to appreciate the risk of doing this sort of thing in science stories."

From the standpoint of newspapers and magazines, good pictures are just as important as the text of a story. Both usually maintain elaborate photographic departments. The photographer is on much the same level of the working newspaper ladder as the reporter. You cannot work with one and ignore the other because their assignments probably come from the same source—the editor.

What are the photographers' common complaints against doctors? Well, here are two examples of how best to "burn" a photographer. When he calls and asks to take your picture, say "yes" in a friendly, cordial way. Then, after he spends an hour getting to your office or meeting, tell him you have changed your mind because "it may be unethical." Or, if you do consent and he spends considerable time setting up his camera and lights, tell him as he starts posing you that he can only take a picture of the back of your head; side or front view shots are out. Just visualize a photographer's frustration!

This all makes for bad public relations toward the medical profession, and such problems should no longer have a place in present-day medical reporting.

When the photographer makes his original request, the physician should refer him to the chairman of the publicity committee of his local society, assuming that the committee is an active one and not serving in name alone. He should provide the photographer with the chairman's name, address, and phone number and invite him to contact the chairman, explaining the reasons for the procedure. In turn, the chairman and/or his committee should inform the photographer of their decision in a comparatively short time, preferably immediately. The less time the better. There is nothing more disconcerting to a photographer than to make a request for a picture and not have the publicity committee act for two or three days. The photographer, like the writer, has a deadline to meet and time to him on any assignment is an important consideration.

If the photographer makes his request of the doctor during a medical meeting where the physician appears on the program, it might be more expedient and feasible for the matter to be referred to the organization's public relations man or press relations contact, both of whom are fully aware of the necessary protocol.

A short time ago a physician read an interesting paper before a national specialty society. The next morning a newspaper carried a story, based on his paper, on the first page. That afternoon a national news magazine requested his picture. The doctor refused on the basis of medical ethics; actually he felt that if the picture appeared, along with the story, in a national magazine he would be held up to ridicule by his colleagues. The photographer contacted the local medical society. Again permission to take the picture was turned down without even checking or weighing the facts with the society's publicity committee. The photographer's persistence finally got the matter to the attention of the society's publicity chairman who, without apparently being acquainted with the actual interpretation of the Principles of Medical Ethics, turned down the request, too.

It would not have been unethical for the committee to grant the photographer permission to take the doctor's picture. The whole matter could have been handled in a matter of minutes. As it turned out, the photographer was given a harmful runaround by people who apparently did not want to be bothered.

Since the doctor had given his paper before an open meeting of an ethical medical society, the photographer was within his rights in requesting the picture. If he had taken the picture while the doctor was delivering his address, neither the doctor nor the medical group could have done anything about it. In refusing permission in this case, the publicity committee was responsible for doing a disservice, publicitywise, to the medical profession as well as to the news magazine.

The committee apparently was unaware of the sentence in the Principles of Medical Ethics which reads: "Refusal to release the material may be considered a refusal to perform a public service . . ."

Generally speaking, the job of handling medical press relations can be boiled down to this:

It is considered unethical for a physician to furnish a story or picture on his own initiative to newspapers or magazines, as

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this smacks too much of self-seeking publicity. On the other hand, if data have been or are being presented publicly in lay or scientific meetings, it is considered ethical if the physician works through the publicity committee or public relations man of his local society. In that way, his colleagues are his judges and, in abiding by their judgment, he cannot be accused of being a publicity seeker.

Investigators associated with medical schools are obligated to conform to the procedures established by their institutions for dealing with reporters and publicity through public relations officials appointed by their institution. It must be emphasized, however, that under the existing code of ethics this procedure does not relieve the investigator of the responsibility of clearing the release with the publicity committee of the local society. Should the latter rule after publication that release of the data is unethical, the physician, not the medical school's public relations council, is held responsible for violation of the code.

Emergency situations often arise in which the time relation between the story already presented at a meeting and its "going to press" make such referrals impossible. In such a case, where decision on publication is no longer in the hands of the physician, he should still make every effort to assure accuracy of the data contained in the news release by working in conjunction with the publicity committee of his county society.

NEW AND NONOFFICIAL REMEDIES

The following additional preparations have been accepted as conforming to the rules of the Council on Pharmacy and Chemistry of the American Medical Association for admission to New and Nonofficial Remedies. A copy of the rules on which the Council bases its action will be sent on application.

R. T. STORMONT, M.D., *Secretary.*

Estrone-U.S.P. (See New and Nonofficial Remedies 1952, p. 332).

Kremers-Urban Company, Milwaukee

Solution Estrugenone in Oil: 1 cc. ampuls and 10 cc. and 30 cc. vials. A solution in sesame oil containing 1 mg. (10,000 I.U.) of estrone in each cubic centimeter. Preserved with 0.5% chlorobutanol.

10 cc. vials. A solution in sesame oil containing 2 mg. (20,000 I.U.) of estrone in each cubic centimeter. Preserved with 0.5% chlorobutanol.

Suspension Estrugenone with Benzyl Alcohol 2%: 1 cc. ampuls and 5 cc. and 10 cc. vials. A suspension in 60% propylene glycol containing 5 mg. (50,000 I.U.) of estrone in each cubic centimeter.

Suspension Estrugenone with Procaine Hydrochloride 1%: 1 cc. ampuls and 10 cc. vials. A suspension in 15% propylene glycol containing 2 mg. (20,000 I.U.) of estrone in each cubic centimeter. Preserved with thimerosal 1:10,000.

Progesterone-U.S.P. (See New and Nonofficial Remedies 1952, p. 348).

The Bio-Intrasol Laboratories, Inc., Brooklyn

Aqueous Suspension Progesterone with Procaine Hydrochloride 1%: 10 cc. vials. An aqueous suspension containing 10 mg. or 25 mg. of progesterone in each cubic centimeter. Preserved with thimerosal 1:10,000.

Solution Progesterone in Oil with Benzyl Alcohol 2%: 10 cc. vials. An aqueous suspension containing 10 mg. or 25 mg. of progesterone in each cubic centimeter. Preserved with thimerosal 1:10,000.

The Upjohn Company, Kalamazoo, Mich.

Aqueous Suspension Progesterone: 1 cc. and 10 cc. vials. A suspension in isotonic salt solution containing 25 mg. of progesterone in each cubic centimeter. Preserved with thimerosal 1:10,000.

Mephenesin (See New and Nonofficial Remedies 1952, p. 432).

C. B. Kendall Company, Indianapolis

Tablets Mephenesin: 0.25 gm. and 0.5 gm.

Diphtheria Toxoid, Aluminum Phosphate Adsorbed.—Aluminum phosphate adsorbed diphtheria toxoid is a sterile suspension of diphtheria toxoid adsorbed on aluminum phosphate. It is detoxified and standardized for potency as described in the monograph on Diphtheria Toxoid, Aluminum Hydroxide Adsorbed. Diphtheria Toxoid, Aluminum Phosphate Adsorbed, complies with the official potency and other requirements of the National Institutes of Health of the United States Public Health Service.

Actions and Uses.—See monograph on Diphtheria Toxoid, Alum Precipitated. Because of the physical character of the adsorbed product, absorption is delayed.

Dosage.—See monograph on Diphtheria Toxoid, Alum Precipitated.

Parke, Davis and Company, Detroit

Diphtheria Toxoid, Aluminum Phosphate Adsorbed: 0.5 cc. vials (one injection), 1 cc. vials (one immunization; two 0.5 cc. injections), 5 cc. vials (five immunizations). Preserved with thimerosal 1:10,000.

Penicillin for Injection for Prolonged Action (See New and Nonofficial Remedies 1952, p. 126).

Irwin, Neisler & Company, Decatur, Ill.

Aqueous Suspension Procaine Penicillin G: 10 cc. vials. A suspension containing 300,000 units of procaine penicillin G in each cubic centimeter. Preserved with 0.18% methylparaben and 0.02% propylparaben.

Procaine Penicillin G in Oil: 10 cc. vials. A suspension in sesame oil containing 300,000 units of procaine penicillin G in each cubic centimeter with 2% aluminum monostearate.

Thiopental Sodium-U.S.P. (See New and Nonofficial Remedies 1952, p. 246).

Abbott Laboratories, North Chicago, Ill.

Pentothal Sodium: 10 gm. multiple dose ampuls. Buffered with 0.6 gm. of anhydrous sodium carbonate.

Penicillin for Oral or Sublingual Administration (See New and Nonofficial Remedies 1952, p. 122).

Premo Pharmaceutical Laboratories, Inc., South Hackensack, N. J.

Tablets Penicillin G (Buffered): 200,000 units. Buffered with calcium carbonate.

Citrated Normal Human Plasma-U.S.P. (See New and Nonofficial Remedies 1952, p. 200).

Junior League Blood Center of Milwaukee, Inc., Milwaukee

Normal Human Plasma (Citrated): Equivalent to 250 cc. of pooled plasma containing 5% dextrose.

p-**Aminosalicylic Acid** (See New and Nonofficial Remedies 1952, p. 87).

Gold Leaf Pharmacal Company, New Rochelle, N. Y.

Tablets Para-Pas: 0.5 gm.

Estrogenic Substances—Conjugated (See New and Nonofficial Remedies 1952, p. 338).

Eli Lilly & Company, Indianapolis

Tablets Konogen: 0.625 mg., 1.25 mg., and 2.5 mg. U. S. Patent 2,429,398.

Penicillin for Inhalation (See New and Nonofficial Remedies 1952, p. 121).

Abbott Laboratories, North Chicago, Ill.

Soluble Tablets Potassium Penicillin G: 250,000 units.

Diiodohydroxyquinoline-U.S.P. (See New and Nonofficial Remedies 1952, p. 154).

G. D. Searle & Company, Chicago

Tablets Diodoquin: 0.65 gm. U. S. Trademark 336,484.

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METABOLISM OF FRUCTOSE IN THE DIABETIC

It has been known for some time that the administration of glucose to dogs or normal human subjects leads to an increase in the pyruvate concentration and a decrease in the level of inorganic phosphate in the blood. These changes also occur when a diabetic patient receiving insulin is given glucose. The increase in the blood pyruvate, coupled with a decrease in inorganic phosphate content, has been used as an index of the metabolism of administered sugar.

Recently, a series of studies [1] on the metabolism of intravenously administered fructose in normal and diabetic subjects has been reported. The changes in the blood concentration of fructose, pyruvate, and inorganic phosphate following an intravenous injection of fructose indicates to these investigators that the metabolism of fructose is different from that of glucose in both normal subjects and diabetic subjects without insulin. After giving fructose to either group there is an increase in pyruvate concentration in the blood with a concurrent decrease in inorganic phosphate level. While the intravenous administration of fructose to a diabetic subject without insulin invokes a large and rapid increase in the pyruvate concentration in the blood, glucose given in a similar manner causes either a slight or a delayed increase in pyruvate. This was interpreted as indicating that the diabetic subject without insulin can metabolize fructose given intravenously in a manner similar to a normal person.

By using the technique of hepatic vein catheterization, Craig and associates [2] studied the metabolism of fructose in the liver of diabetic and nondiabetic persons. Following the intravenous administration of fructose, they found that the livers of both groups of subjects removed large amounts of fructose from the blood. Also, livers of the diabetic and nondiabetic subjects produced increased amounts of pyruvic acid after the injection of fructose. In the absence of ketosis, the liver of the diabetic subjects was found to metabolize fructose in a manner similar to that in the nondiabetic person; however, when ketosis occurred there was a normal uptake of fructose but a decreased production of pyruvic and lactic acids.

The investigations on the metabolic aberration in diabetes have yielded promising information in recent years, particularly since the Embden-Meyerhof scheme for the anaerobic breakdown of glucose has been widely accepted. Since fructose normally enters the scheme of glycolysis subsequent to the point at which glucose is phosphorylated, these studies on the metabolism of fructose are consistent with the concept that the phosphorylation of glucose to glucose-6-phosphate is impaired in the diabetic. The phosphorylation of fructose, on the other hand, appears to proceed at its normal rate in the diabetic without insulin.

1. Miller, M., and others: Metabolism of Intravenous Fructose and Glucose in Normal and Diabetic Subjects, J. Clin. Investigation **31**: 115-125, 1952.

2. Craig, J. W., and others: Metabolism of Fructose by the Liver of a Diabetic and Non-Diabetic Subjects, Proc. Soc. Exper. Biol. & Med. **78**: 698-702, 1951.

BLOOD TRANSFUSION IN IRRADIATION HEMORRHAGE

The threat of atomic warfare and the ever-increasing peacetime exploitation of atomic energy have focused attention on the necessity for developing methods for the control or prevention of irradiation injury in man. The mortality in animals exposed to high levels of irradiation has been reduced by the administration of the broad spectrum antibiotics,[1] by early exchange transfusion,[2] by parabiosis,[3] or by the implantation of fresh splenic tissue or the injection of spleen homogenates.[4] In contrast, while the use of frequent whole blood transfusions would seem a logical method of combating the thrombocytopenia and anemia in the abnormal bleeding syndrome of irradiation sickness, Allen and his associates have shown that in dogs such transfusions not only are ineffective but may in some instances actually be harmful.[5] The University of Chicago investigators exposed 173 dogs to single doses of total body x-radiation at dosage levels ranging from 175 to 450 r and compared the survival times of control animals and of animals given three transfusions a week with compatible blood. They found that the animals that received transfusions survived no longer than the controls and at autopsy displayed as many areas of gross hemorrhage. Furthermore, while blood transfusion did benefit to some extent the irradiation anemia, it did not correct the thrombocytopenia or leukopenia and failed to prevent or control the post-irradiation increase in whole blood clotting time. In some animals, the transfusions appeared to exert a deleterious effect, possibly owing to transfusion reactions, which,

1. Miller, C. P.; Hammond, C. W., and Tompkins, M.: Reduction of Mortality from X-Radiation by Treatment with Antibiotics, Science **111**: 719 (June 30) 1950. Allen, J. G.; Moulder, P. V., and Enerson, D. M.: Pathogenesis and Treatment of the Postirradiation Syndrome, J. A. M. A. **145**: 704 (March 10) 1951. Furth, F. W.; Coulter, M. P., and Howland, J. W.: The Effect of Aureomycin on the Radiation Syndrome in Dogs, Am. J. Path. **28**: 25 (Jan.-Feb.) 1952; The Effect of Aureomycin and Terramycin on the X-Radiated Rat, Am. J. Path. **28**: 185 (March-April) 1952.

2. Swisher, S. N., and Furth, F. W.: Effect of Early Small Exchange Transfusion on the X-Irradiated Dog, Proc. Soc. Exper. Biol. & Med. **78**: 226 (Oct.) 1951.

3. Brecher, G., and Cronkite, E. P.: Post-Radiation Parabiosis and Survival in Rats, Proc. Soc. Exper. Biol. & Med. **77**: 292 (June) 1951.

4. Jacobson, L. O., and others: Further Studies on Recovery from Radiation Injury, J. Lab. & Clin. Med. **37**: 683 (May) 1951. Cole, L. J.; Fishler, M. C.; Ellis, M. E., and Bond, V. P.: Protection of Mice Against X-Irradiation by Spleen Homogenates Administered After Exposure, Proc. Soc. Exper. Biol. & Med. **80**: 112 (May) 1952.

5. Allen, J. G., and others: Blood Transfusion in Irradiation Hemorrhage, Science **115**: 523 (May 8) 1952.

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according to the authors, occur much more frequently in irradiated than in nonirradiated dogs.

Allen and his co-workers point out that, since the status of blood types and transfusions in dogs is as yet ill-defined, the failure of frequent blood transfusions to prolong the survival time of irradiated dogs does not necessarily mean that such measures would be ineffective in man. Furthermore, they emphasize that their results do not relate in any manner to the use of blood in the treatment of shock incident to the early blast effects of an atomic burst or to blood needs in anoxic anemia. On the other hand, they feel that on the basis of their results a more cautious attitude toward the use of frequent transfusions alone as a therapeutic measure in the treatment of the latent symptoms of irradiation in man may be indicated.

MOVIE PORTRAYS DOCTOR AT WORK

RKO-Radio Pictures has just released a 15 minute documentary film called "Your Doctor" to commercial theaters throughout the country. The film portrays a story that is one of the finest tributes ever paid to the medical profession.

The picture, which was prepared with the assistance of the American Medical Association, reveals the high quality and ready availability of medical care in this country. In cities and towns American physicians may be virtually around the corner, but in the mountains of Hickory Nut Valley, N. C., the work of a 37-year-old general practitioner, George Bond, exemplifies what doctors are doing in hundreds of rural communities. The story behind the movie is built around Dr. Bond, who has realized a life-long ambition—the establishment of the Valley Clinic and Hospital, one of many institutions supplying the best in medical care to remote areas.

The movie ends with this conclusion: "In the lives of men and women who practice the art and science of medicine is realized the noblest of human aspirations. For long ago it was said that in no other act does man approach so near the gods as when he is restoring the sick to the blessing of health."

RKO, which is trying to book "Your Doctor" in as many local theaters as possible, estimates that the film will be shown during 1952 in about 3,000 theaters, reaching an audience of 10 to 15 million persons. However, that audience can be doubled if physicians throughout the country help publicize local showings. County and state medical societies are being asked to cooperate in any way possible with theaters showing "Your Doctor." If the film is being shown in your community, urge your patients and friends to see it. The theater manager will suggest other ways in which you can help.

"Your Doctor" is an inspiring story for the lay public, and, as a result, the medical profession will benefit immeasurably if a large segment of the U. S. population sees it. The picture dispels many misconceptions about doctors; for that reason it is imperative that everything possible be done to help local theaters build a sizable audience.

NUTRITION AND THE OLDER ADULT

As time passes and the life expectancy of our population slowly increases, some apprehension appears with respect to the physiological well-being of the older adults. This group is not characterized by age in years alone but rather by a discernible decline in physical vigor and activity. Because of the lack of precise evaluation of the problem, the nutrition during later years of life has attracted considerable attention, and one recent comment [1] presents a well-considered point of view. The general principles governing the planning of a diet for the aged are not different from those for other age groups. The subjects themselves often plan their dietary program in the pattern of their youth, a period before the foundations of good nutrition were firmly established. Furthermore, because there is diminished physical activity, less food is required, and interest in food lags when mastication is difficult or digestive activity is retarded. Chronic disease, combined with economic and psychological factors, operates to develop an over-simplified dietary program, one that is too frequently deficient in protective foods.

In the light of a decreased need for energy, the daily caloric value of the diet often can be surprisingly low; older women frequently are in nitrogen balance and maintain weight on 1,500 calories or less, and men maintain weight on 2,000 calories or less. Certainly, the commoner tendency toward obesity is to be decried. There is little evidence for the need for increased consumption of protein in the elderly. Because of the tendency toward a relationship between serum cholesterol and atherosclerosis and because of the parallelism between dietary fat and the level of serum cholesterol, it appears prudent to decrease the proportion of fat in the diet in the later years of life. While there is little evidence that older adults have different requirements for vitamins, it does seem wise to allow generous amounts of iron and of calcium in the diet of the aged.

In the aged, it is quite likely that under conditions of restricted activity and the associated diminished food intake the resultant intestinal residue will not stimulate the one-a-day bowel movement that has become the popular goal in this respect. In no other connection does habit and mental attitude play a larger part than with defecation. The same program of education that will protect the older person from the alluring claims of the food-faddist should reassure him that the natural roughage in the fruit, leafy vegetables, and whole grain cereals of a good diet will promote satisfactory intestinal evacuation. All the aspects of nutrition in the later years of life merit continued study.

1. Keys, A.: Nutrition for the Later Years of Life, Pub. Health Rep. 67: 484 (May) 1952.

MEDICAL NEWS

ARIZONA

Dr. Yount Honored.—Dr. Clarence Yount Sr., a past president, secretary, and treasurer of the Arizona Medical Society and a member of its 50-Year Club, helped to organize the Yavapai County Medical Society in 1904, has served as its president and secretary-treasurer, and helped to organize county societies in Coconino and Navajo. Appointed health officer of Prescott in 1933, he served until February, 1951. He has been affiliated with the following hospitals in Prescott: Yapai County, Mercy, Prescott Community, and Whipple Veterans. On May 31 the "golden anniversary of service to the community, the state and to his country" was observed in Prescott by an informal open house at the Monday Club in honor of Dr. Yount.

ILLINOIS

Department of Medical Social Work.—A department of social work has been established at the University of Illinois College of Medicine. It will be concerned with the teaching of students in the college of medicine in Chicago and students in the school of social work in Urbana who are specializing in medical social service. It may also provide instruction for a limited number of students enrolled in the school of social work at the University of Chicago. Mary L. Hemmy, M.S., formerly director of the social service department at Washington University Clinics and Allied Hospitals, St. Louis, became head of the newly established department on July 1.

Appoint Rehabilitation Medical Director.—The Peoria Institute of Physical Medicine and Rehabilitation has announced the appointment of Dr. H. Worley Kendell as medical director. Dr. Kendell, who has been head of the department of physical medicine and rehabilitation at the University of Illinois College of Medicine, Chicago, will remain on the faculty of the university as clinical professor of physical medicine and rehabilitation. Dr. Frances A. Hellebrandt, chief of the division of medical research of the Baruch Center of Physical Medicine and Rehabilitation of the Medical College of Virginia, Richmond, has been appointed to the chairmanship of the University of Illinois department.

Chicago

Personal.—At the recent opening in London of the joint meeting of the Orthopedic Associations of the English-Speaking World, "jewels of office" were presented by Queen Mother Elizabeth to the visiting presidents of the constituent groups. One was bestowed on Dr. Fremont A. Chandler as president of the American Orthopedic Association. Similar presentations were made to the presidents of the Canadian, Australian, New Zealand, and South African orthopedic associations.

University News.—Dr. Bruno Minz, *maitre des recherches* of the laboratory of general physiology at the Sorbonne, Paris, is spending six months as visiting research professor of pharmacology at the University of Illinois College of Medicine. Dr. Minz, who is giving a series of seminars to graduate students, is engaged in studies on the transmission of impulses in the central nervous system and on the influence of hormones on convulsive thresholds.——Dr. Robert E. Madden of Oak Park has received the Borden Undergraduate Research Award for 1952 for studies on radioactive sulfur and the metabolism of amino acids containing sulfur, which he recently conducted at the University of Illinois College of Medicine. The award, sponsored by the Borden Company Foundation, Inc., represents a gift of $500.

Physicians are invited to send to this department items of news of general interest, for example, those relating to society activities, new hospitals, education and public health. Programs should be received at least three weeks before the date of meeting.

KANSAS

Appointment of New Dean.—Dr. William C. Wescoe, who has been professor of pharmacology and experimental medicine at the University of Kansas School of Medicine in Kansas City, has been appointed dean of the school. Dr. Edward H. Hashinger, who accepted a one year term as acting dean when Dr. Franklin D. Murphy was made chancellor of the university, will return to his rank of professor of medicine. Dr. Wescoe has been assistant editor of the *Journal of Pharmacology and Experimental Therapeutics* since 1948 and a Markle scholar in the medical sciences since 1949.

KENTUCKY

Citizen of the Year.—The Algernon Sidney Sullivan Medallion, presented annually by the University of Kentucky to the commonwealth's outstanding citizen of the year, was recently awarded to Dr. Alice Newcome Pickett, former head of the department of obstetrics at the University of Louisville School of Medicine. Dr. Pickett has been head of the department of obstetrics for 30 years. The citation that accompanied the medallion stated that Dr. Pickett had "established many prenatal clinics throughout the Commonwealth and many hundreds of specialists, trained by her, have gone out into cities and villages of Kentucky bringing her great skills and noble philosophy to mothers and infants."

MICHIGAN

Tuberculosis Award.—The first Bruce H. Douglas Award, for work combating tuberculosis, was recently given to Dr. Edward J. O'Brien of Detroit by the Michigan Trudeau Society. Dr. O'Brien, head of the chest surgery department of the Detroit Department of Health, is past president of the American Association for Thoracic Surgery and was president of the state group for eight years.

Dr. LeGalley Goes to Saudi-Arabia.—Dr. Kenneth B. LeGalley has left Port Huron to assume his duties as chief surgeon with the Bahrein Petroleum Company on Bahrein Island in the Gulf of Persia. Dr. LeGalley is past president of the St. Clair County Medical Society and has served as county physician since 1932. He was chairman of the medical staff of Port Huron Hospital during 1950-1951 and was chairman of the hospital surgical staff before his departure.

MISSOURI

Alumni Association Election.—The Medical Alumni Association of Washington University in St. Louis recently elected as president Dr. Wendell G. Scott, associate professor of clinical radiology at the university. Other new officers are Dr. James B. Costen, associate professor of otolaryngology, first vice-president, and Dr. Walter M. Baumgarten Jr., instructor in clinical medicine, second vice-president, both of the medical school. Dr. Guy N. Magness of University City was reelected secretary-treasurer.

Course in Pathology of Eye.—The department of ophthalmology, Washington University School of Medicine, St. Louis, announces an intensive one week course (Sept. 8-12) in the pathology of the eye and its adnexa. The course, which will consist of about 40 hours of instruction, both didactic and microscopic, will be given by Dr. Theodore E. Sanders and will cover essentially the material presented in the instruction in pathology during the eight month basic course in ophthalmology. The course will be limited to 10 physicians. The fee will be $125, of which $25 is payable at the time of acceptance. Communications should be addressed to the Department of Ophthalmology, Washington University School of Medicine, 640 S. Kingshighway Blvd., St. Louis 10.

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NEW YORK

Hospital News.—Dr. Eugene R. Marzullo was recently made medical director of St. John's Episcopal Hospital, Brooklyn. He has been clinical professor of medicine at the State University of New York's College of Medicine in Brooklyn since 1940.

Dr. Henry Allen Honored.—Members of Cattaraugus County Medical Society honored Dr. Henry C. Allen, Gowanda, at a testimonial dinner on his retirement from the practice of medicine. Dr. Allen, a past president of the county society, has served as Gowanda's health officer since 1920 and as an Erie Railroad surgeon since 1922.

Man of the Year.—The Rochester Business and Professional Men's Club recently named Dr. Michael J. Crino "Man of the Year" for "unselfish devotion to this community as a physician and as an outstanding leader in civic affairs." Dr. Crino is commissioner of the American Legion Junior Baseball League, vice-president of the Genesee Hospital staff, and a sector chief of the Monroe County civil defense organization.

Narcotic Addicts to Be Reported.—A new state law requiring all physicians to report to health officials all cases of narcotic addiction went into effect July 1. The law, part of an extensive antinarcotics program passed by the 1952 legislature, stipulates that physicians must report the names and addresses, if known, of all habitual users of narcotics to district state health officers, county health commissioners, or city health officers.

Personals.—At the annual dinner of the University of Buffalo General Alumni Board, June 11, the Samuel P. Capen Alumni Award was presented to Dr. Nelson G. Russell of the class of 1895 for outstanding services to the university. Dr. Russell, who is professor of medicine emeritus of the university, joined the medical faculty in 1897.——Dr. I. Jay Brightman of Albany has received permanent appointment as state director of welfare medical services, a newly created state post.——Dr. James E. McCambridge, Poughkeepsie, was honored at the annual dinner of the Society of Ex-House Surgeons of the Manhattan Eye, Ear and Throat Hospital as the sole surviving member of the original founders of the society in 1906.

New York City

Dr. Jacoby Retires from Health Department.—Dr. Adolph Jacoby, director of the health department's bureau of social hygiene, has retired after 36 years service in the campaign against venereal disease. He will continue his teaching and private practice as well as his service as attending gynecologist at New York University-Bellevue Medical Center. Dr. Samuel S. Frank, who has been medical consultant in the bureau of social hygiene since 1940, was named as Dr. Jacoby's successor.

New York Physicians' Books.—Eighty-eight volumes representing the book production of New York City physicians during 1951 are on display in the library of the New York Academy of Medicine, 2 East 103rd Street, where they may be seen Monday through Saturday from 9 a. m. to 5 p. m. The number of medical books throughout the country was 10% greater than in 1950. The larger increase for New York City authors makes them responsible for over 18% of all medical books published in the United States in 1951.

Cerebral Palsy Center Dedicated.—The Manhattan Cerebral Palsy Recreation Center was formally dedicated June 2. The four room unit, which was opened last November, has an enrollment of 25 children. Plans are under way to open additional units in Brooklyn and the Bronx next fall. Funds for the center are provided by United Cerebral Palsy and the Gotham Philanthropic League for Cerebral Palsy. A grant of $10,000 from the league provides for the center's personnel and the specially designed wooden toys that permit afflicted children to participate in normal play with others.

Free Cytologic Detection Service.—In cooperation with the New York City Cancer Committee and the New York University-Bellevue Medical Center, the health department has established a free cytologic (Papanicolaou smear) detection service for uterine cancer in three health districts. The service is limited to medically indigent patients of physicians whose offices are located in the Lower East Side, East Harlem, and Central Harlem health districts. The cytologic examinations will be performed by a unit of the University-Bellevue Medical Center with funds provided by the New York City Cancer Committee. The health department has made available a limited number of cytology kits containing equipment required for taking vaginal and cervical smears. These may be procured from the district health offices at the Lower East Side Health Center, 341 E. 25 St.; East Harlem Health Center, 158 E. 115 St.; and Central Harlem Health Center, 2238 Fifth Ave., Monday through Friday from 9 a. m. to 5 p. m.

NEW JERSEY

Society News.—At the annual meeting of the New Jersey Society of Clinical Pathologists in Atlantic City, May 19, Dr. Edwin H. Albano of East Orange was elected president; Dr. Thomas K. Rathmell of Trenton, vice-president; and Dr. Robert Brill of Passaic, secretary-treasurer.

Dr. Watson Morris Honored.—Overlook Hospital, Summit, recently honored its senior member, Dr. Watson B. Morris of Springfield, who has practiced medicine for 50 years, served on the medical staff of the hospital from 1913 to 1946, and has since been on its consulting staff. The medical staff sponsored a testimonial dinner at the Canoe Brook Country Club.

OHIO

Centenarian Dr. Zenner.—Dr. Philip Zenner of Cincinnati recently celebrated his 100th birthday. Dr. Zenner, who is professor emeritus of neurology at the University of Cincinnati College of Medicine, was the first professor of neurology at the college and was a member of the first board of physicians at Jewish Hospital, Cincinnati.

State Medical Election.—At the annual meeting in Cleveland, May 20-22, the Ohio State Medical Association elected Dr. Harve M. Clodfelter of Columbus, president; Dr. Paul A. Davis, Akron, president-elect; and Dr. Richard L. Meiling, Columbus, treasurer. The next annual meeting of the association will be held in Cincinnati, April 21-23, 1953.

Fifty Year Pins Presented.—On the anniversary of the Academy of Medicine of Cleveland, 50 year pins were presented to Drs. William E. Gernhard, Walter A. Haldy, Homer J. Hartzell, Nathaniel M. Jones, Edward P. Monaghan, Oscar Pan, Frank Roth, and Jacob E. Tuckerman. Pins and certificates were awarded in absentia to Drs. Henry Jenkins, William J. Manning, Ben Peskind, Carlos E. Pitkin, and Edward F. Romig.

Academy Award.—At its 50th annual meeting, the Academy of Medicine of Cleveland bestowed on Dr. Lawrence A. Pomeroy, "distinguished citizen of Cleveland, faithful member of the Academy and pioneer in the community control of cancer," its 1952 Distinguished Service Award. Dr. Pomeroy, who served as president of the Cleveland Medical Library Association in 1946 and 1947 and as president of the academy in 1927, appointed the academy's first committee on health education and was instrumental in establishing the first tumor clinic in Cleveland. In 1951 he was awarded the Distinguished Service Medal of the American Cancer Society.

OKLAHOMA

Memorial Hospital.—The new Memorial Hospital at Woodward, located on the courthouse square, was formally dedicated and opened on June 1. The hospital is a memorial to casualties of World Wars I and II and to victims of the tornado of April 9, 1947. Mayor Brandon Frost presented the building to the Memorial Hospital Foundation. Dr. Joe L. Duer is chief of staff.

Appreciation Day.—Dr. William T. Hawn was honored by the people of Binger and surrounding areas at an "appreciation day" in Binger Park. Dr. Hawn, who has served as mayor and on the town board of Binger, has been president, vice-president and member of the board of directors of the Caddo County Medical Society, and was awarded a life membership in the Oklahoma Medical Society.

PENNSYLVANIA

Society News.—Effective Sept. 6 the name of the *Pittsburgh Medical Bulletin* will be changed to the *Bulletin of the Allegheny County Medical Society*.——The Pennsylvania Academy of General Practice recently installed as president Dr. Anthony T. Merski of Erie.

Hospital Retirements.—Twelve staff members, with a total of 428 years of hospital service, have retired from the medical and surgical staffs of Harrisburg Hospital. They will, however, remain as consultants of the hospital and will continue their private practice. They are Drs. Harvey F. Smith, aged 81, with 52 years of hospital service; George F. Gracey, 78; George H. Seaks, 75; George R. Moffitt, 73; Park A. Deckard, 71; Carson Coover, 70; Norman B. Shepler, 69; Joseph W. Shaffer, 69; Harry M. Kirkpatrick, D.D.S., 68; Allen Z. Ritzman, 67; Frank F. D. Reckord, 66; and George L. Laverty, 65.

Philadelphia

University News.—Dr. Victor C. Vaughan III, formerly assistant professor of pediatrics in the Yale University School of Medicine, New Haven, Conn., has been appointed associate professor of pediatrics in the Temple University School of Medicine.——Dr. John B. Levan, chief of the cardiology department of St. Joseph's Hospital, Reading, has been named as assistant professor of medicine at the Woman's Medical College in Philadelphia. Dr. Levan is president of the Pennsylvania Heart Association and has been supervising graduate courses in cardiology in 10 cities for the Medical Society of the State of Pennsylvania.

Pittsburgh

Society News.—The Pittsburgh Urological Association has elected the following officers for the coming year: Dr. Joseph G. Moore, president; Dr. William C. D. McCuskey, Wheeling, W. Va., president-elect; and Dr. Conrad A. Kuehn, secretary-treasurer.

TEXAS

Inaugurate Preceptor Plan.—Texas physicians are putting into practice a plan for placing senior medical students of the University of Texas Medical Branch in Galveston, in the homes of family doctors for 11 weeks. They will accompany their preceptor on hospital rounds, in the operating room, during office interviews, on house calls, and during emergency visits. All preceptors are members of the Texas Academy of General Practice.

Controlled Polio Experiment.—A 10 day controlled experiment was instituted on July 2 on 35,000 children, aged 1 to 6, half of whom received injections of gamma globulin. Of the eight clinics set up in Harris County to handle the experiment, five are in Houston. The $500,000 project, which is being conducted by Dr. William McD. Hammon, professor of epidemiology at the University of Pittsburgh, assisted by Dr. Lewis L. Coriell, medical director of the Camden (N. J.) Municipal Hospital for Contagious Diseases, and Helen Moore of the Detroit Department of Health, is financed by the National Foundation for Infantile Paralysis. Similar experiments were undertaken in Utah last summer with 5,768 children. According to the U. S. Public Health Service, for the week ended June 28 there were 206 cases of polio in Texas, as compared with 62 for the week ended June 30 last year.

HAWAII

American of the Week.—Dr. Robert B. Faus, Honolulu, chairman of the advisory council to the governor of civil defense, was recently selected as "American of the Week" by the American Way Committee of the Honolulu Chamber of Commerce.

Dr. Holmes Lectures in Orient.—Dr. William J. Holmes of Honolulu has returned from a tour of the Far East and India. He was guest speaker at the annual All India Ophthalmologic Conference, and in New Delhi and Bombay spoke before the local ophthalmologic societies; at Vellore he served as visiting professor of ophthalmology at the Christian Medical College. In Japan Dr. Holmes served as a special ophthalmic consultant to the Surgeon General.

GENERAL

Narcotics Bibliography.—A comprehensive list of books and journal articles dealing with drug addiction, compiled by the library of the New York Academy of Medicine, is being issued jointly by the academy and the Welfare Council of New York City. It is available from the council, 44 E. 23rd St., New York 10, for 50 cents.

Society Election.—At the annual meeting of the American Association for Cancer Research in Detroit, Dr. Stanley P. Reimann, director of the Institute for Cancer Research, Philadelphia, was elected president; Dr. Harold P. Rusch, professor of oncology, University of Wisconsin Medical School, Madison, vice-president; and Hugh J. Creech, Ph.D., of the Institute for Cancer Research, Philadelphia, secretary-treasurer.

Trudeau Society Desires Papers.—The American Trudeau Society, medical section of the National Tuberculosis Association, invites the submission of abstracts of scientific papers for representation at its next annual meeting in Los Angeles, May 18-22, 1953, at the Hotel Statler. For information write to the Chairman of the Medical Sessions Committee, American Trudeau Society, 1790 Broadway, New York 19.

Prizes for Cancer Research.—At its annual meeting the American Association for Cancer Research presented Anna Fuller Memorial Prizes "for outstanding and original research on the role of viruses in cancer" to Dr. F. Peyton Rous, Rockefeller Institute for Medical Research, New York; Dr. Francisco Duran-Reynals, Yale University School of Medicine, New Haven, Conn.; and Dr. Richard E. Shope, Merck Institute for Therapeutic Research, Rahway, N. J.

Ida Scudder International Grant.—The American Association of University Women announces the Ida S. Scudder International Grant of $500, a gift of the Scudder Association, to help a woman physician from India to study in the United States. Dr. Scudder, who in 1918 founded the Vellore Christian Medical School for women, celebrated her golden jubilee of medical work in India in 1950. The school, now affiliated with the University of Madras, has recently admitted men students.

Lecturers Wanted for Foreign Countries.—Through its secretary general, Dr. Louis H. Bauer of Hempstead, N. Y., President of the American Medical Association, the World Medical Association requests national medical associations to notify the secretariat when well-qualified physicians are planning visits to foreign countries and desire to give lectures in the countries they are visiting. Such information should be sent to Dr. Louis H. Bauer, Secretary General, The World Medical Association, 2 E. 103rd St., New York 29.

New Health Chief for Virgin Islands.—Gov. Morris F. de Castro recently announced the appointment of Dr. Roy A. Anduze as commissioner of health for the Virgin Islands and as chief municipal physician for the municipality of St. Thomas and St. John. Dr. Anduze served his internship at Freedman's Hospital, Washington, D. C., where he was assistant resident in gynecology and obstetrics. He was appointed to the staff of Frederiksted Hospital as municipal physician of St. Croix in 1940, and was made director of the venereal disease control program at St. Thomas in 1942.

Society News.—At the annual meeting of the American Pediatric Society at Old Point Comfort, Va., May 6-8, Dr. Irvine McQuarrie, Minneapolis, was elected president; Dr. Ernest J. Caulfield, Hartford, Conn., vice-president; Dr. Aims C. McGuinness, Philadelphia, secretary-treasurer; Dr. Stewart H. Clifford, Brookline, Mass., recorder; and Dr. Henry G. Poncher, Chicago, member of the council. Dr. Richard W. B. Ellis, Edinburgh, Scotland, and Sir James Spence, Newcastle upon Tyne, England, were elected honorary members of the society. The John Howland Award for distinguished service to pediatrics was bestowed on Dr. Edwards A. Park, Baltimore.

Elizabeth Blackwell Awards.—Five American women physicians have received the annual Blackwell awards of the New York Infirmary for significant contributions to the practice and teaching of medicine. The citations were bestowed on Ethel C.

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Dunham, adjutant professor of pediatrics, Georgetown University School of Medicine, Washington, D. C., for study and improved care of premature infants; Edith L. Potter, assistant professor of pathology (obstetrics and gynecology), University of Chicago School of Medicine, for her work in infant pathology; Annie V. Scott of the American Presbyterian Mission, Cheeloo University School of Medicine, Tsinan, Shantung, China, for the practice and teaching of pediatrics in foreign missions; Martha M. Eliot, chief of the Children's Bureau, U. S. Dept. of Labor, Washington, D. C., for her contributions to child welfare and international public health; and to Catharine Macfarlane, research professor of gynecology, Woman's Medical College of Pennsylvania, Philadelphia, for achievements in the practice of gynecology, in cancer research, and in medical education.

Prevalence of Poliomyelitis.—According to the National Office of Vital Statistics, the following number of reported cases of poliomyelitis occurred in the United States, its territories and possessions in the weeks ended as indicated:

Area	June 28, 1952	June 21, 1952	June 30, 1951
New England States			
Maine	3	..	..
New Hampshire	..	1	..
Vermont	1	..	..
Massachusetts	1	1	7
Rhode Island	..	..	..
Connecticut	2	..	5
Middle Atlantic States			
New York	21	15	17
New Jersey	3	1	3
Pennsylvania	4	1	3
East North Central States			
Ohio	22	18	3
Indiana	9	6	4
Illinois	8	6	17
Michigan	13	4	9
Wisconsin	10	6	10
West North Central States			
Minnesota	2	3	2
Iowa	20	16	2
Missouri	5	3	..
North Dakota	1	1	5
South Dakota	..	..	..
Nebraska	2	5	3
Kansas	19	3	6
South Atlantic States			
Delaware	..	..	3
Maryland	..	..	1
District of Columbia	1	..	1
Virginia	..	5	3
West Virginia	6	5	2
North Carolina	9	9	5
South Carolina	1	1	1
Georgia	16	7	13
Florida	10	12	15
East South Central States			
Kentucky	4	3	2
Tennessee	9	2	5
Alabama	8	8	14
Mississippi	26	21	8
West South Central States			
Arkansas	9	4	9
Louisiana	36	17	22
Oklahoma	22	4	13
Texas	206	146	62
Mountain States			
Montana	5	7	..
Idaho	..	1	..
Wyoming	2	2	..
Colorado	5	2	2
New Mexico	6	2	5
Arizona	2	6	8
Utah	..	..	..
Nevada	..	..	..
Pacific States			
Washington	14	12	4
Oregon	2	2	2
California	39	53	48
Territories and Possessions			
Alaska	..	..	2
Hawaii	6	6	..
Puerto Rico	..	..	..
Total	590	427	346

CANADA

Cerebral Palsy Clinic.—The Edmonton Cerebral Palsy Association recently opened a clinic in Edmonton, Alberta, where children can be taken for therapy as well as school work. The clinic represents the cooperative efforts of the public, who contributed funds for its establishment; the Alberta Health Department, which supplied the staff and much of the equipment; an Edmonton lumber company, which constructed and donated special chairs; an Edmonton club, which provided a bus to transport the children to and from their homes; and city firemen who volunteered as drivers.

FOREIGN

Anti-Tuberculosis Campaign in Arabia.—A BCG vaccination campaign against tuberculosis in Aden, Arabia, has been successfully carried out by the United Nations International Children's Emergency Fund and the World Health Organization with the cooperation of the government, according to a report submitted to WHO's regional office in Alexandria. The first phase of the campaign, directed by international personnel, has been completed. Between January and May more than 31,000 children were tested for tuberculosis and 8,000 vaccinated, and the international team trained national personnel to carry on BCG work. The campaign is now being conducted by local health authorities with the aid of supplies and equipment that will be provided for another year.

Penicillin Treatment for Venereal Disease in Ethiopia.—Penicillin treatments for syphilis were scheduled to be introduced in Addis Ababa in July by the Ethiopian Ministry of Public Health and the World Health Organization. The venereal disease control project will include serologic testing of the inhabitants of Addis Ababa and will demonstrate the efficacy of penicillin in curing syphilis and other venereal diseases. A fully equipped WHO team of three experts will be sent to work with an Ethiopian team under P. Serra, chief of the venereal disease center at Addis Ababa. Facilities for the work will be provided by the government at the Filoha and Tekla Haimanot Clinics. Arrangements have been made to conduct blood tests at the laboratories of the Pasteur Institute, formerly the Imperial Ethiopian Medical Research Institute of Addis Ababa. In addition to blood testing and treatment the project will include investigation of the distribution of venereal disease throughout the country.

EXAMINATIONS AND LICENSURE

BOARDS OF MEDICAL EXAMINERS

ALASKA:* *Examination.* Juneau. On application in other towns where there are board members. *Reciprocity.* On application. Sec., Dr. W. M. Whitehead, Box 140, Juneau.

CALIFORNIA: *Written.* Los Angeles, Aug. 18-21; Sacramento, Oct. 20-23. Application must be received at least two weeks prior to date of examination. *Oral for Reciprocity Applicants.* Los Angeles, Aug. 16; San Francisco, Nov. 8. Applicants are requested not to arrange to come to an oral examination until they receive notice from the Credentials Committee. *Oral and Clinical for Foreign Medical School Graduates.* Los Angeles, Aug. 17; San Francisco, Nov. 9. Sec., Dr. Frederick N. Scatena, 1020 N St., Sacramento.

GUAM: The Commission on Licensure will meet whenever a candidate appears or submits his credentials. Ex. Sec., Dr. Austin W. Matthis, Agana.

ILLINOIS: *Examination.* Chicago, Sept. 23-25. Supt. of Regis., Mr. Charles F. Kervin, Capitol Bldg., Springfield.

MISSOURI: *Reciprocity.* Jefferson City, July 27. Ex. Sec., Mr. John A. Hailey, Box 4, State Capitol Bldg., Jefferson City.

MONTANA: Helena, Oct. 6-8. Sec., Dr. S. A. Cooney, 214 Power Block, Helena.

NEVADA:* Carson City, Aug. 4. Sec., Dr. George H. Ross, 112 Curry St., Carson City.

NEW HAMPSHIRE: Concord, Sept. 10. Sec., Dr. John S. Wheeler, 107 State House, Concord.

NORTH CAROLINA: *Reciprocity.* Raleigh, Aug. 2. Sec., Dr. Joseph J. Combs, 419 Professional Bldg., Raleigh.

OREGON:* *Examination.* Portland, July 7-9. *Reciprocity.* Portland, July 25-26. Final date for filing application was June 16. Exec. Sec., Mr. Howard I. Bobbitt, 609 Failing Bldg., Portland.

TEXAS: *Reciprocity.* Fort Worth, Aug. 3. Sec., Dr. M. H. Crabb, 1714 Medical Arts Bldg., Fort Worth.

WYOMING: Cheyenne, Oct. 6. Sec., Dr. Franklin D. Yoder, State Office Bldg., Cheyenne.

BOARDS OF EXAMINERS IN THE BASIC SCIENCES

ALASKA: *Examination.* On application. Juneau or other towns in Territory as decided by Board. *Reciprocity.* On application. Sec., Dr. C. Earl Albrecht, Box 1931, Juneau.

COLORADO: *Examination.* Denver, Sept. 10-11. Sec., Dr. Esther B. Starks, 1459 Ogden St., Denver 18.

DISTRICT OF COLUMBIA: *Examination.* Washington, Oct. 20-21. Sec., Dr. Daniel L. Seckinger, 4130 E. Municipal Bldg., Washington.

MICHIGAN: *Examination.* Detroit and Ann Arbor, Oct. 10-11. Sec., Mrs. Anne Baker, 423 W. Michigan Ave., Lansing.

NEBRASKA: *Examination.* Omaha, Oct. 7-8. Director, Bureau of Examining Boards, Mr. Husted K. Watson, 1009 State Capitol Bldg., Lincoln.

OKLAHOMA: *Examination.* Oklahoma City, Sept. 13. Sec., Dr. Clinton Gallaher, 813 Braniff Bldg., Oklahoma City.

OREGON: *Examination.* Portland, Sept. 6 and Dec. 6. Sec., Dr. Charles D. Byrne, State Board of Higher Education, University of Oregon, Eugene.

RHODE ISLAND: *Examination.* Providence, Aug. 13. Administrator of Professional Regulations, Mr. Thomas B. Casey, 366 State Office Bldg., Providence.

TEXAS: *Examination.* Austin, October. Sec., Brother Raphael Wilson, 407 Perry-Brooks Bldg., Austin.

WISCONSIN: *Examination.* Madison, Sept. 13, Milwaukee, Dec. 6. Sec., Mr. W. H. Barber, 621 Ransom St., Ripon.

* Basic Science Certificate required.

MEETINGS

ALASKA TERRITORIAL MEDICAL ASSOCIATION, Anchorage, Aug. 21-23. Dr. William P. Blanton, P. O. Box 2569, Juneau, Secretary.

AMERICAN ASSOCIATION OF OBSTETRICIANS, GYNECOLOGISTS AND ABDOMINAL SURGEONS, The Homestead, Hot Springs, Va., Sept. 4-6. Dr. William F. Mengert, 2211 Oak Lawn Ave., Dallas, Texas, Secretary.

AMERICAN CONGRESS OF PHYSICAL MEDICINE, Roosevelt Hotel, New York, Aug. 25-29. Dr. Frances Baker, One Tilton Ave., San Mateo, Calif., Secretary.

AMERICAN PHYSIOLOGICAL SOCETY, New Orleans, Sept. 4-6. Dr. E. F. Adolph, University of Rochester School of Medicine and Dentistry, Rochester, N. Y., Secretary.

BIOLOGICAL PHOTOGRAPHIC ASSOCIATION, Hotel New Yorker, New York, Sept. 10-12. Mr. Lloyd E. Varden, Pavelle Color, Inc., 533 W. 57th St., New York 19, Secretary.

MEDICAL SOCIETY OF DELAWARE, Rehoboth, Sept. 8-10. Dr. Andrew M. Gehret, 822 North American Bldg., Wilmington, Secretary.

NATIONAL MEDICAL ASSOCIATION, Chicago, Aug. 11-15. Dr. John T. Givens, 1108 Church St., Norfolk 10, Va., General Secretary.

NEVADA STATE MEDICAL ASSOCIATION, Reno, Aug. 21-23. Dr. William A. O'Brien III, 505 Chestnut St., Reno, Secretary.

NEW HAMPSHIRE MEDICAL SOCIETY, Mt. Washington Hotel, Bretton Woods, Sept. 7-9. Dr. Deering G. Smith, 44 Chester St., Nashua, Secretary.

POST GRADUATE MEDICAL ASSEMBLY OF SOUTH TEXAS, Shamrock Hotel, Houston, July 21-23. Dr. C. A. Dwyer, 229 Medical Arts Bldg., Houston, Secretary.

RENO SURGICAL SOCIETY CONFERENCE, Reno, Nevada, Aug. 21-23. Dr. Olin C. Moulton, 130 N. Virginia St., Reno, Nevada, Chairman.

ROCKY MOUNTAIN RADIOLOGICAL SOCIETY, Denver, Aug. 7-9. Dr. Maurice D. Frazer, 1037 Stuart Bldg., Lincoln, Neb., Secretary.

U. S. CHAPTER, INTERNATIONAL COLLEGE OF SURGEONS, Conrad Hilton Hotel, Chicago, Sept. 2-5. Dr. Arnold S. Jackson, 1516 Lake Shore Drive, Chicago, Executive Secretary.

UTAH STATE MEDICAL ASSOCIATION, Salt Lake City, Sept. 4-6. Dr. T. C. Weggeland, 42 S. Fifth East St., Salt Lake City, Secretary.

VERMONT STATE MEDICAL SOCIETY, Mt. Washington Hotel, Bretton Woods, N. H., Sept. 7-9. Dr. James P. Hammond, 128 Merchants Row, Rutland, Secretary.

WASHINGTON STATE MEDICAL ASSOCIATION, Olympic Hotel, Seattle, Sept. 13-17. Dr. Bruce Zimmerman, 338 White-Henry-Stuart Bldg., Seattle, Secretary.

WEST VIRGINIA STATE MEDICAL ASSOCIATION, The Greenbrier, White Sulphur Springs, July 24-26. Mr. Charles Lively, P. O. Box 1031, Charleston, Executive Secretary.

INTERNATIONAL

AMERICAN CONGRESS OF INDUSTRIAL MEDICINE, Rio de Janeiro, Brazil, Sept. 20-28. General Secretarial Office: Calle Arenales No. 981 Buenos Aires, Argentina.

AUSTRALASIAN MEDICAL CONGRESS, Melbourne Victoria, Australia, Aug. 22-30. Dr. C. H. Dickson, Medical Society Hall, 426 Albert St., East Melbourne, Victoria, Australia, General Secretary.

EUROPEAN CONGRESS OF CARDIOLOGY, University of London, Bloomsbury, W.C.1, England, Sept. 10-12. Dr. K. Shirley Smith, 35 Wimpole St., London, W.1, England, Secretary.

EUROPEAN SOCIETY OF CARDIOVASCULAR SURGERY, Strasbourg, France, Oct. 3-4. Sir James Learmonth, Department of Surgery, University New Buildings, Edinburgh 8, Scotland.

INTERAMERICAN CARDIOLOGICAL CONGRESS, Buenos Aires, Argentina, Aug. 31-Sept. 7. Dr. Blas Moia, Larrea 1132, Buenos Aires, Argentina, Secretary-General.

INTER-AMERICAN CONGRESS OF PUBLIC HEALTH, Havana, Cuba. Sept. 27-Oct. 1. Pan-American Sanitary Bureau, 2001 Connecticut Ave., Washington, D. C.

INTER-AMERICAN CONGRESS OF RADIOLOGY, Mexico City, Mexico, Nov. 2-8. Dr. Guido Torres Martinez, Marsella No. 11, Mexico, D.F., Secretary-General.

INTERNATIONAL CONGRESS OF ANTHROPOLOGY AND ETHNOLOGY, Vienna, Austria, Sept. 1-8. For information write: Secretaries, Royal Anthropological Institute, 52 Upper Bedford Place, London, W.C.1, England.

INTERNATIONAL CONGRESS OF BIOCHEMISTRY, Paris, France, July 21-27. Prof. Jean Courtois, 4, Avenue de l'Observatoire, Paris 6e, France, Secretary.

INTERNATIONAL CONGRESS OF DERMATOLOGY AND SYPHILOLOGY, London, England, July 21-26. Dr. Gordon B. Mitchell-Heggs, 5, Lisle St., London, W.C.2, England, General Secretary.

INTERNATIONAL CONGRESS ON DISEASES OF THE CHEST, Rio de Janeiro, Brazil, Aug. 24-30. Mr. Murray Kornfeld, 112 East Chestnut St., Chicago 11, Illinois, Executive Secretary.

INTERNATIONAL CONGRESS OF HAEMATOLOGY, Mar del Plata, Argentina, Sept. 21-26. Dr. Carlos Reussi, Anchorena 1710, Buenos Aires, Argentina, Secretary.

INTERNATIONAL CONGRESS OF THE HISTORY OF MEDICINE, Nice-Cannes, France, and Monaco, Sept. 8-14. Dr. F. A. Sondervorst, 124 Avenue des Allies, Louvain, Belgium, Secretary-General.

INTERNATIONAL CONGRESS ON HYDATID DISEASE, Santiago, Chile, Nov. 21-24. Organizing Committee, P. O. Box 9183, Santiago, Chile.

INTERNATIONAL CONGRESS OF INTERNAL MEDICINE, Friends House, London, N.W.1, Eng. Sept. 15-18. Sir Harold Boldero, 12 Pall Mall East, London, S.W.1, England, Secretary.

INTERNATIONAL CONGRESS OF MEDICAL PRESS, Venice, Italy, Oct. 4-5. Dr. Bruno de Biasio, S. Marco 4646, Venice, Italy, Secretary.

INTERNATIONAL CONGRESS ON MEDICAL RECORDS, London, England, Sept. 7-12. Miss Gwen Perkins, 120 C Street S.E., Washington, D. C., Chairman.

INTERNATIONAL CONGRESS OF MILITARY MEDICINE AND PHARMACY, Montevideo, Uruguay, March 1-7. Dirreccion General del Servico de Sanitad Militar, 8 de Octubre y Mariano Moreno, Montevideo, Uruguay, Secretariat of the Congress.

INTERNATIONAL CONGRESS ON NEUROPATHOLOGY, Rome, Italy, Sept. 8-13. Dr. Armando Ferraro, 722 W. 168th St., New York, N. Y., U. S. A., Secretary General.

INTERNATIONAL CONGRESS OF OTORHINOLARYNGOLOGY, Amsterdam, Netherlands, June 8-15, 1953. Dr. W. H. Struben, J. J. Viottastraat 1, Amsterdam, Netherlands, Secretary.

INTERNATIONAL CONGRESS OF UROLOGY, The Waldorf-Astoria, New York, N. Y., U. S. A., Sept. 15-18. Dr. John A. Taylor, 2 East 54th St., New York, N. Y., U. S. A., Secretary-General.

INTERNATIONAL HOSPITAL CONGRESS, London, England, May 25-30, 1953. Capt. J. E. Stone, 10 Old Jewry, London, EC2, England, Hon. Secretary.

INTERNATIONAL UNION AGAINST TUBERCULOSIS, Rio de Janeiro, Brazil, Aug. 24-27. Prof. Etienne Bernard, 66 Blvd. St. Michel, Paris 6e, France, Secretary-General.

MEDICAL WOMEN'S INTERNATIONAL ASSOCIATION, Vichy, France, Sept. 12-16. Dr. Margaret M. Wurts, 27 East Wellesley Road, Montclair, N. J., U. S. A., National Secretary.

NEURORADIOLOGIC SYMPOSIUM, Stockholm, Sweden, Sept. 17-20. Docent Ake Lindbom, Symposium Neuroradiologicum, Serafimerlasarettet, Stockholm K., Sweden, Secretary.

WORLD CONGRESS OF JEWISH PHYSICIANS, Jerusalem, Israel, Aug. 10-14. Secretariat: % Israel Medical Association, Rehov Mesilat Yesharim, Beth Kovatz, Jerusalem, Israel.

WORLD CONGRESS OF MEDICINE, Montecatini, Italy, Oct. 16-18. Secretariat: Corso Trieste, 65, Rome, Italy.

WORLD FEDERATION OF MENTAL HEALTH, Brussels, Belgium, Aug. 25-Sept. 1. Dr. J. R. Rees, 19 Manchester St., London, W.1, England, Secretary.

WORLD MEDICAL ASSOCIATION, Athens, Greece, Oct. 12-16. Dr. Louis H. Bauer, 2 East 103d St., New York 29, N. Y., Secretary General.

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DEATHS

Wood, Neal Naramore ✦ Santa Clara, Calif.; born in Lamar, Mo., July 24, 1884; University of Michigan Department of Medicine and Surgery, Ann Arbor, 1908; Army Medical School, 1912; commissioned in the regular Army Medical Corps and later resigned; served during World War I; formerly professor of public health (hospital administration) at College of Medical Evangelists, Loma Linda and Los Angeles, and on the faculty of his alma mater; formerly health director of Charlevoix, Emmet, Otsego, and Antrim counties in Michigan and in charge of the Bay County (Mich.) department of health; at one time superintendent of the Los Angeles County General Hospital in Los Angeles, and director of Starling-Loving University Hospital in Columbus, Ohio, and Hillman Hospital in Birmingham, Ala.; died in Agnews State Hospital in Agnew March 25, aged 67, of chronic myocarditis and arteriosclerosis.

Spangler, Davis ✦ Dallas, Texas; born in Bonham, Texas, Sept. 30, 1892; University of Texas School of Medicine, Galveston, 1913; clinical assistant professor of radiology, Southwestern Medical School of the University of Texas; specialist certified by the American Board of Radiology; member of the Radiological Society of North America of which he was vice-president, American Roentgen Ray Society, and the American College of Radiology; past president of the Dallas County Medical Society; served in France during World War I; during World War II county chairman of procurement and assignment of medical personnel for the military services; affiliated with Texas Scottish Rite Hospital for Crippled Children, Children's Medical Center and Medical Arts Hospital; died in Gaston Hospital April 13, aged 59, of rheumatic heart disease and coronary sclerosis.

Booth, Thomas Fagan ✦ Pulaski, Tenn.; Vanderbilt University School of Medicine, Nashville, Tenn., 1926; member of the American Academy of General Practice; died in Baptist Hospital, Knoxville, April 9, aged 50, of cerebral hemorrhage.

Brookie, Roger William ✦ Flora, Ind.; Northwestern University Medical School, Chicago, 1908; served during World Wars I and II; died in Tifton, Ga., April 22, aged 69, of heart failure.

Caseley, Walter Norris, Long Beach, Calif.; Central Medical College of St. Joseph, Mo., 1895; affiliated with Seaside Hospital, where he died April 7, aged 78.

Cornell, Earl Hamilton, Oakland, Calif.; University of California Medical School, San Francisco, 1913; physician for the Matson Navigation Company for many years; died in Yreka April 23, aged 64, as the result of an automobile accident.

Harrod, George ✦ Conway, Ark. (licensed in Arkansas in 1903); died April 11, aged 82, of heart disease.

Hawkins, Norman Louis ✦ Watertown, N. Y.; Columbia University College of Physicians and Surgeons, New York, 1902; specialist certified by the American Board of Pediatrics; member of the American Academy of Pediatrics; affiliated with Good Samaritan and Mercy hospitals; died recently, aged 70, of cerebral embolism, arteriosclerotic heart disease, and chronic cholecystitis.

Hays, Thomas Walden, Cincinnati; Medical College of Ohio, Cincinnati, 1888; for many years on the staff of St. Mary's Hospital; died in St. Francis Hospital April 3, aged 88, of arteriosclerotic heart disease.

Henry, Taylor H., Columbus, Miss.; Memphis (Tenn.) Hospital Medical College, 1899; state senator; died in Jackson March 23, aged 76.

Herff, Adolph ✦ Boerne, Texas; Jefferson Medical College of Philadelphia, 1880; fellow of the American College of Surgeons; formerly practiced in San Antonio, where he was affiliated with Santa Rosa Hospital; died recently, aged 93, of cancer.

✦ Indicates Member of the American Medical Association.

Hoare, Harry James, Los Angeles; College of Physicians and Surgeons, Medical Department of the University of Southern California, Los Angeles, 1910; died recently, aged 68.

Hochwalt, Gustav A., Dayton, Ohio; Starling Medical College, Columbus, 1895; for many years affiliated with Miami Valley Hospital and St. Elizabeth Hospital, where he died recently, aged 79, of cardiovascular renal disease.

Jacobi, Felix ✦ New York City; Kaiser-Wilhelms-Universität Medizinische Fakultät, Strasbourg, Germany, 1908; died April 1, aged 69, of leukemia.

Jacobs, Gustave Edgar ✦ St. Louis; St. Louis College of Physicians and Surgeons, 1915; member of the American Academy of General Practice; died April 5, aged 68, of heart disease.

Kenoyer, William Ray ✦ Hugoton, Kan.; University of Kansas School of Medicine, Kansas City, 1931; served during World Wars I and II; county coroner; died April 16, aged 54, of coronary heart disease.

Klavenes, Eivind, St. Paul; Kongelige Frederiks Universitat Medizinske Fakultet, Oslo, Norway, 1897; died April 10, aged 81, of coronary sclerosis.

Lee, Edwin Henry ✦ Tuskegee, Ala.; Howard University College of Medicine, Washington, D. C., 1915; affiliated with Veterans Administration Hospital; died recently, aged 65, of melanosarcoma of the liver.

Leicht, Phillip ✦ Lakemills, Wis.; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1907; an Associate Fellow of the American Medical Association; served during World War I; died in Milwaukee recently, aged 69, of abscess of the lung and bronchopneumonia.

Leonard, Isaac Edward ✦ Atlantic City, N. J.; College of Physicians and Surgeons, Boston, 1899; also a graduate in pharmacy; formerly member of the board of education; died March 31, aged 89, of cerebral thrombosis.

Levin, Arthur Aaron, Brooklyn; University and Bellevue Hospital Medical College, New York, 1921; died recently, aged 53.

Lowry, Casper Franklin, Dover, Fla.; Georgia College of Eclectic Medicine and Surgery, Atlanta, 1910; died March 30, aged 68, of carcinoma of the lung and liver.

McCarthy, Michael Joseph, Philadelphia; Medico-Chirurgical College of Philadelphia, 1916; died recently, aged 60, of carcinoma of the laryngopharynx.

McDonald, George Oliver ✦ Detroit; University of Toronto Faculty of Medicine, Toronto, Ontario, Canada, 1920; died in Thamesford, Ontario, April 8, aged 60, of coronary thrombosis.

McLean, John Allan Cameron ✦ Somerville, Mass.; Harvard Medical School, Boston, 1904; an Associate Fellow of the American Medical Association; served during World War I; veteran of the Spanish-American War; member of the senior consulting staff of Somerville Hospital, where he died April 8, aged 72, of cerebral hemorrhage.

McMillan, Robert C. ✦ Monmouth, Ill.; the Hahnemann Medical College and Hospital, Chicago, 1905; served as city health officer; formerly on the staff of the Monmouth Hospital; died in Moline April 13, aged 89, of cerebral arteriosclerosis.

Meckstroth, Henry Louis ✦ Mansfield, Ohio; Jefferson Medical College of Philadelphia, 1908; served during World War I; died March 12, aged 69.

Miller, Burton Jonathan, Massillon, Ohio; Homeopathic Hospital College, Cleveland, 1887; died March 18, aged 88.

Nanninga, John Benjamin ✦ Newton, Kan.; Rush Medical College, Chicago, 1928; certified by the National Board of Medical Examiners; affiliated with Bethel Deaconess Hospital; died April 18, aged 53, of coronary occlusion.

Panaro, Peter Thomas ✦ New York; University of Arkansas School of Medicine, Little Rock, 1928; died Feb. 7, aged 51.

Parkhurst, Jane Hunting Sutherland, San Francisco; New York Medical College and Hospital for Women, Homeopathic, New York, 1902; at one time health officer of Burlingame; served on the staff of Hahnemann Hospital, where she died April 18, aged 85, of coronary disease.

Parnell, Henry Elliott ✦ Perrine, Fla.; Kentucky School of Medicine, Louisville, 1908; served overseas during World War I; died in Lake City April 20, aged 70.

Pectol, Charles F. ✦ Spencer, Ind.; Louisville (Ky.) Medical College, 1898; for many years county health officer; died in St. Vincent's Hospital, Indianapolis, April 7, aged 85, of cerebral hemorrhage.

Ramstad, N. Oliver ✦ Bismarck, N. D.; University of Minnesota College of Medicine and Surgery, Minneapolis, 1899; past president of the North Dakota State Medical Association; member of the founders group of the American Board of Surgery; died in St. Petersburg, Fla., recently, aged 76, of arteriosclerosis.

Ries, Gay K. Durbin, Wilmington, Del.; Woman's Medical College of the New York Infirmary for Women and Children, New York, 1892; at one time practiced in Chicago; died recently, aged 86, of myocardial infarction.

Rigby, Owen Compton ✦ Shreveport, La.; Tulane University of Louisiana School of Medicine, New Orleans, 1920; member of the Southeastern Surgical Congress; fellow of the American College of Surgeons; on the staff of the Tri-State Hospital and North Louisiana Sanitarium; died recently, aged 63.

Sandifer, Vollie LaFayette ✦ Logansport, La.; Atlanta Medical College, 1915; died recently, aged 62.

Scheer, George Henry, Sheboygan, Wis.; Rush Medical College, Chicago, 1903; served with the U. S. Public Health Service; affiliated with Sheboygan Memorial Hospital and St. Nicholas Hospital, where he died April 7, aged 74, of coronary thrombosis.

Schellhamer, William Heinly ✦ York, Pa.; Medico-Chirurgical College of Philadelphia, 1916; member of the Industrial Medical Association; served during World War I; on the staff of York Hospital; died March 21, aged 59.

Scherrer, Frederick William Jr. ✦ St. Louis; St. Louis University School of Medicine, 1928; specialist certified by the American Board of Otolaryngology; on the staffs of the Barnes and Evangelical Deaconess hospitals; died April 7, aged 49, of cerebral hemorrhage.

Schindler, Hans Joachim ✦ New York; Kaiser-Wilhelms-Universität Medizinische Fakultät, Strasbourg, Germany, 1905; died April 21, aged 70, of carcinoma.

Seville, David Walter ✦ Bellevue, Pa.; Western Pennsylvania Medical College, Pittsburgh, 1900; on the staff of the Suburban General Hospital, where he died April 4, aged 82.

Seymour, Charles R., Binghamton, N. Y.; Albany (N. Y.) Medical College, 1892; member of the American Medical Association; twice president of the Broome County Medical Society; served during World War I; for many years connected with the National Guard; in 1944 was given a citation for distinguished service by the Alumni Association of Albany Medical College; on the staff of the Binghamton City Hospital, where he died April 28, aged 82, of coronary thrombosis.

Shaw, Manning Franklin, Omega, Ga.; University of Georgia Medical Department, Augusta, 1912; on the staff of the Vereen Memorial Hospital in Moultrie; died in John D. Archbold Memorial Hospital, Thomasville, April 2, aged 65, of carcinoma of the prostate.

Sheller, William Owen ✦ Los Angeles; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1902; an Associate Fellow of the American Medical Association; affiliated with St. John's and Santa Monica hospitals in Santa Monica, and Culver City (Calif.) Hospital; died April 23, aged 78, of rupture of a dissecting aortic aneurysm, hypertension, and arteriosclerosis.

Sisk, Crete Nixon, Morganton, N. C.; University of Nashville Medical Department, 1905; district health officer; served as health officer of Vance County; died recently, aged 69, presumably of cardiovascular crisis.

Smith, Elisha Baker ✦ Birmingham, Ala.; Birmingham Medical College, 1912; died recently, aged 64, of coronary occlusion and cerebral accident.

Smith, Frank Arthur ✦ Westbrook, Maine; Medical School of Maine, Portland, 1915; died recently, aged 69, of cerebral hemorrhage and hypertension.

Smith, Robert Gillespie, Fayetteville, Ark.; Ohio State University College of Medicine, Columbus, 1940; served during World War II; died March 20, aged 40.

Smithwick, Marsena Parker ✦ Boston; Harvard Medical School, Boston, 1895; formerly affiliated with the Boston City Hospital; medical inspector for the public schools; died March 30, aged 84.

Stephens, John Henry, Hendersonville, Tenn.; University of Nashville Medical Department, 1901; died recently, aged 81, of injuries received in an automobile accident.

Sweeney, John Joseph ✦ Upper Darby, Pa.; Medico-Chirurgical College of Philadelphia, 1914; formerly trustee and councilor, Second Councilor District, Medical Society of the State of Pennsylvania; past president of the Delaware County Medical Society; affiliated with Misericordia, St. Agnes, and St. Joseph's hospitals, all in Philadelphia, and the Fitzgerald-Mercy Hospital in Darby, where he died April 18, aged 62, of gastric and duodenal ulcer and intestinal obstruction.

Talbot, Benjamin H., Ruston, La.; Medical Department of Tulane University of Louisiana, New Orleans, 1893; died April 27, aged 81, of cardiovascular accident.

Terrell, Leland Leslie, Woodbine, Ky.; University of Louisville (Ky.) Medical Department, 1910; for many years member of the school board; died in Lenoir City, Tenn., April 8, aged 62, of diabetes mellitus.

Thomas, Deleon Hale, French Camp, Miss. (licensed in Mississippi in 1911); died in Baptist Hospital, Jackson, April 2, aged 68.

Waller, Amos Orville ✦ Eugene, Ore.; College of Physicians and Surgeons of San Francisco, 1916; past president of the Lane County Medical Society; served during World War I; formerly member of the state legislature; affiliated with Sacred Heart General Hospital, where he was chief of staff; died April 16, aged 69, of a heart attack.

Watson, James ✦ Cleveland; Northwestern University Medical School, Chicago, 1925; specialist certified by the American Board of Psychiatry and Neurology; member of the American Psychosomatic Society, American Psychiatric Association and the Association for Research in Nervous and Mental Diseases; formerly chief neuropsychiatrist, Regional Office, Veterans Administration; served during World War II; an ordained minister; died April 27, aged 68, of myocardial infarction and arteriosclerosis.

Webb, William S. ✦ Wheeling, W. Va.; College of Physicians and Surgeons, Baltimore, 1904; affiliated with Ohio Valley General Hospital and Wheeling Hospital, where he died April 11, aged 73, of acute suppurative pancreatitis.

Weighart, Joseph Benjamin ✦ New York; Cornell University Medical College, 1901; for many years on the staff of French Hospital; died April 27, aged 79, of a heart attack.

Whitaker, Darel Wesley, Batesville, Miss.; University of Tennessee College of Medicine, Memphis, 1925; died March 22, aged 59, of coronary thrombosis.

Williams, Owen Hassell ✦ Savannah, Tenn.; University of Nashville Medical Department, 1907; died March 22, aged 71, of a heart attack.

Wilson, Middleton Ford, New Orleans; Medical Department of Tulane University of Louisiana, New Orleans, 1903; died in Southern Baptist Hospital April 13, aged 73, of carcinoma.

Woltz, John Louis, Mount Airy, N. C.; Southern Medical College, Atlanta, 1897; died March 21, aged 79, of arteriosclerotic heart disease.

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GOVERNMENT SERVICES

ARMY

Medical Service Celebrates 177th Anniversary.—The Army Medical Service will celebrate its 177th anniversary on July 27. From the small group of doctors and assistants organized as a medical department by the Continental Congress in 1775 at the behest of General George Washington, the Army Medical Service has grown to the largest military medical service in existence. Whether in combat or out, Army medical personnel are dedicated to the task of safeguarding and restoring the health of the individual soldier, and the combined efforts of its physicians, nurses, medical specialists, and enlisted men and women have created the healthiest combat force in history.

Society Election in Japan.—Col. George M. Powell is the newly-elected president of the Southern Honshu Medical Society, chosen during a society meeting at the 279th General Hospital. The colonel is chief of medical service at Osaka Army Hospital. Col. Sterrett E. Dietrich, commanding officer of the Kyoto Army Hospital, was elected first vice-president; Lieut. Col. John L. Mothershead, commanding officer, Nara Station Hospital, second vice-president; Major Carl Meeks, orthopedic clinic chief, 382nd General Hospital, secretary; and Lieut. Col. Edward P. Shannon, professional service chief, 279th General Hospital, treasurer.

ATOMIC ENERGY COMMISSION

Oak Ridge Institute Renews Contract.—The Atomic Energy Commission and the Oak Ridge Institute of Nuclear Studies, Inc., have signed a contract for the institute to continue its operation of certain programs for the AEC for another five years. This nonprofit educational corporation is composed of 30 member universities in the South and Southwest. The president of the institute is Dr. Paul M. Gross, vice-president of Duke University. The chief resident officer is Dr. William G. Pollard, executive director. Founded in 1946, with 14 charter member universities, the institute uses some of the unique atomic energy facilities in Oak Ridge to carry out research and training in the nuclear sciences.

The basic purposes of the institute are (1) to stimulate cooperation between the government and participating universities, in undertaking fundamental research in atomic energy; (2) to foster increased opportunities and improved programs of graduate study and education in nuclear energy in educational institutions of this region; (3) to aid in acquisition and training of scientific personnel; and (4) to use Oak Ridge's unique facilities for graduate research and instruction.

Specialized programs carried on by the institute include the conduct of courses in the handling of radioactive isotopes; the operation of a long-range research program on the treatment of malignant diseases; and the operation of the American Museum of Atomic Energy, together with its traveling exhibits. The institute also sponsors programs cooperatively with the Oak Ridge National Laboratory, which is operated by Carbide and Carbon Chemicals Co., and administers the AEC-sponsored fellowship program on a nationwide basis.

Member universities of the Institute are: Agricultural and Mechanical College of Texas, Alabama Polytechnic Institute, Catholic University of America, Clemson Agricultural College, Duke University, Emory University, Forida State University, Georgia Institute of Technology, Louisiana State University, Mississippi State College, North Carolina State College, Rice Institute, Tulane University of Louisiana, Vanderbilt University, Virginia Polytechnic Institute, University of Alabama, University of Arkansas, University of Florida, University of Georgia, University of Kentucky, University of Louisville, University of Maryland, University of Mississippi, University of North Carolina, University of South Carolina, University of Oklahoma, University of Puerto Rico, University of Tennessee, University of Texas, and University of Virginia.

DEPARTMENT OF DEFENSE

The Armed Forces Medical Library.—The appointment of Lieut. Col. Frank B. Rogers (MC) as director of the recently established Armed Forces Medical Library has been announced. The library, the largest institution of its kind in the world, will serve as a central medical library for the Army, Navy, and Air Force and as a national library for medicine and related sciences. The library's extensive facilities will also be available to medical research and development contractors, other governmental agencies, and civilian physicians and medical scientists of all countries.

Formerly known as the Army Medical Library, the newly-named establishment gained an international reputation through the publication of its Index-Catalogue, the most extensive bibliography of medicine in existence. In 1950 the decision was made to phase out the remaining activities of this monumental bibliography and to substitute for it a monthly publication, the Current List of Medical Literature. This publication enables the library to maintain an up-to-date bibliography of the world's medical literature.

Functioning mostly on a mail order basis, the library receives requests for books, references, and other material from all over the world. During the fiscal year 1951, more than 29,700 books were lent to borrowers in the United States. During that same period requests for information numbered 55,900. The library is able to furnish microfilms or photostatic copies of desired material for a very nominal sum. Also available are microfilm copies of publications which may be obtained on a loan basis. The photoduplication service received 56,000 orders requiring over 1,500,000 pages of film and print reproductions during the fiscal year 1951.

In 1942 because of space limitations, it became necessary for the library to move part of its collection to Cleveland, where a history of medicine division was established at the Allen Memorial Medical Library on the campus of Western Reserve University. To this location was transferred all of the medical literature written prior to 1850. The art section of the library has more than 21,000 pictures and almost 13,000 negatives.

PUBLIC HEALTH SERVICE

Fetal Deaths.—The 70,584 fetal deaths at the gestational age of 20 weeks or more registered in the United States for 1949 is the lowest number ever recorded, according to a recent report by the National Office of Vital Statistics. The fetal death ratio based on this figure is 19.8 per 1,000 live births. Although the 1949 figure is the lowest on record for the United States, it fails by a large margin as a measure of the pregnancy loss problem. The U. S. National Committee on Vital and Health Statistics has estimated that if fetal deaths of all gestational ages were recorded, the annual number in this country would be about half a million. However, until 1950, the definition of a fetal death (stillbirth) for registration purposes related exclusively to fetuses reaching the 20th week of gestation, and the definition and reporting requirements in many states varied from the national recommendation.

In 1950, the Third World Health Assembly recommended uniform adoption of the following, broader definition: "Fetal death is death prior to the complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of pregnancy; the death is indicated by the fact that after such separation, the fetus does not breathe or show any other evidence of life such as beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles." The new definition has been adopted by numerous national organizations and during 1951 several states took action to place the definition in effect.

FOREIGN LETTERS

CHILE

Ten Years of Preventive Medicine.—The law concerning preventive medicine came into being in 1938 and applies to all workers who are included under the social security law. It consists of an annual examination, including serologic tests for syphilis, a chest roentgenogram, and a cardiovascular check-up (blood pressure and auscultation). If the person is suspected of having either syphilis, tuberculosis, or cardiovascular disease, he is sent for further investigation to a specialist. Free treatment and rest are provided if his condition can be improved. During the period of treatment the patient receives his usual salary, but it is paid to him by the government from a fund into which the employer pays 1% of the employee's salary. The study presented by Prof. B. Viel refers to the examination of 97,255 white collar employees of Santiago examined during the 10 years 1938-1947.

Syphilis.—Of the 97,255 persons examined the prevalency of persons with syphilis was 5%, there being 3 to 4 times more men afflicted than women. During the last 10 years the prevalence decreased by 53% in men and by 83% in women. The incidence, which was 1%, decreased by 50%. All this seems to prove that the number of cases of syphilis to be seen in the future will be fewer and fewer. The treatment did not produce epidemiological changes because in no case was the contact brought under examination. The drugs used were the arsenic-bismuth combinations, which are very antiquated. Now penicillin has radically changed the problem. The conclusion drawn by the author is that there is no sense in making a mass serologic test of the population partly because the vast majority of cases found in this manner are of the noncontagious type of syphilis and also because the number of syphilis victims is decreasing day by day.

Tuberculosis.—Of the persons examined for the first time between the years 1938 and 1947, 19% were sent to specialists in bronchopulmonary disease. The prevalency of tuberculosis was 5% and has decreased during the 10 years by 45%. The incidence was 1.5%, and its decrease is even greater than that of prevalency. Thus between the years 1943 and 1947 it dropped by 64%. During the 10 years of work, 4,741 persons were diagnosed as suffering from tuberculosis. Of these, 82% were diagnosed during their first check-up, 12.2% in the annual control examinations of persons previously considered as healthy, 2.9% in the annual check-up of inactive tuberculosis patients, and 3.1% during annual examination of patients who did not want to consult the specialist after their first check-up. Not taking into consideration this last group we may safely say that the most productive group in regard to the finding of tuberculosis patients, irrespective of the nature of their lesions, is that of the so-called inactive tuberculosis patients, followed by persons examined for the first time, and lastly by the annual check-up of the group of healthy persons. Of the 4,741 patients 39.4% had minimal tuberculous lesions, 34.5% moderate lesions, 9% advanced lesions, 8.6% extrapulmonary tuberculosis, and 8.5% pleurisy. Of the total of 4,741 patients 90.2% benefited from the law of preventive medicine. Of the 395 cases of pleurisy 96.4% were considered healthy after treatment, and 3.6% were incurable. Less than nine months of rest were necessary in 50%. Of the patients with minimal tuberculous lesions 97% were cured and 50% had less than eight months' rest. Of the 1,612 cases of moderate lesions 71% were cured. Analyzing these results the author concludes that the recuperation of the patient is better when the lesion is smaller and those with a negative bacilloscopy have a better prognosis than those with a positive bacilloscopy.

If we compare the percentage of persons who died after 10 years after having been treated with that of persons who were considered incurable from the very start we see that the mortality in the first group is 10% and in the second group 60%. The author points out that the surviving 40% of the incurable group presents a very serious problem in dissemination of the disease. Regarding the treatment, 4,276 underwent sanatorial rest, surgery, or pneumotherapy. The author points out that the sanatorial treatment was done with no sense of epidemiology. Thus only 41.1% of patients with a positive bacilloscopy were sent to sanatoriums, and 15% with a negative bacilloscopy and 20% in whom no search for Koch's bacillus was made were sent to sanatoriums. The author points out that, since there is such a shortage of beds, these must be used in a more practical manner and since those patients with a positive bacilloscopy are twice as dangerous from the point of view of contagion than those with a negative bacilloscopy the former group must be given preference for sanatorial rest.

Cardiovascular Diseases.—Of the patients examined 18.8% were sent to a specialist of cardiovascular diseases. The prevalency of cardiovascular disease was 5.8% and was higher than tuberculosis and syphilis. Whereas the latter two decreased considerably during the 10 years of observation the incidence of cardiovascular disease only showed a small drop. The incidence is 2%. At their first examination 77% of the total number of cases were diagnosed. The yearly examination of the so-called healthy group gave 18% and that of the suspected group gave the final 5%. Regarding the etiological diagnosis, hypertension accounted for 70% of the patients, including arteriosclerosis 35.8%, valvular lesions 8.2%, cardiovascular syphilitic lesions 6.6%, and myocardial infarctions 2.5%; dysthyroidism 1%; polyarticular rheumatism 1.6%; congenital heart disease 0.4%; and chronic pulmonary heart disease 0.3%.

The patients were catalogued into four groups according to their functional capacity: (1) those who were asymptomatic, (2) those who presented discrete symptoms but were still able to work, (3) those whose working capacity was decreased, and (4) those who presented symptoms even at rest. During the first check-up 61% belonged to the first group, 20.3% to the second, 16.8% to the third, and 1.3% to the fourth. This brings us to the conclusion that only 36% of the patients require therapy. The author points out that 70% of the hypertensive group were asymptomatic, and 68.8% of the arteriosclerosis patients, 11.2% of the polyarticular rheumatism patients, 48.5% of nonsyphilitic valvular lesions patients, 63.8% of cardiovascular syphilitic patients, and 34% of the congenital heart disease patients did not have symptoms. The average age was 48 years in patients with heart disease, 36.7 years in the syphilitic group, and 30.3 years in the tuberculosis group. Of the 6,724 diagnosed cardiopaths 1,330 were given the benefits of the law. The percentage of those to enjoy the privileges of the law was smaller in the hypertensive and the arteriosclerotic group. This was to be expected because approximately 70% of these patients were asymptomatic. The law was applied to persons of the second and third group of the above-mentioned classification. The first was excluded because the patients were asymptomatic, and the fourth was excluded because the patients were considered as incurable. Thus 30% of the patients in the second group were receiving benefits from the law and 70% of the third group. Thus we see that 19% of all diagnosed cardiovascular patients received active therapy. Eighty per cent of the patients were improved, and therapy failed in only 10.7% of the cases; however, the high percentage of improvement obtained should not give a false impression of the situation because during these 10 years 209 patients who were considered improved presented on one or more occasions symptoms of relapse. Of this unimproved group 50% were hypertensive patients, 20% with valvular lesions, 10% arteriosclerosis, 7.5% myocardial infarctions, and 6.3% rheumatism; 0.6% were victims of hyperthyroidism; and 2% had other diseases.

The items in these letters are contributed by regular correspondents in the various foreign countries.

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Mixed Pathologic Conditions.—1. Syphilis and tuberculosis: Of the patients with active syphilis 3.2% had some type of tubercular lesion. If we would apply the prevalency of tuberculosis to syphilitic patients to obtain the number of patients with tuberculosis that should exist theoretically among them we would find that the number is 222 cases whereas the 3.2% represents 170 cases. Thus a superficial analysis might induce us to the erroneous conclusion of saying that syphilis decreases the risk of tuberculosis. The author rejects this affirmation by saying that we cannot apply the prevalency of the tuberculosis group to the syphilitic group because of the difference of age in each case. 2. Syphilis and cardiovascular disease: In 443 cases the diagnosis was a syphilitic cardiovascular lesion. In case the prevalency of cardiovascular disease was to be applied to syphilitic patients the number of heart disease cases should have been 302, instead of the 443; however, there is a difference of 12 years between the average age of the syphilitic patient, who is much younger, and the cardiac patient. 3. Tuberculosis and cardiovascular disease: Only 1% of the tuberculous patients had heart disease. Thus if we were to apply the prevalency of cardiovascular disease to the tuberculosis group we could expect 270 instead of the 47 cases. The age factor again plays an important part in the correction of the prevalence. Concerning mixed pathologic conditions the author points out that, except in cases of syphilis and cardiovascular lesions, there are very few cases in which there are more than one diagnosis.

ISRAEL

Rabies Campaign.—Rabies incidence has been declining steadily in Israel since the start of the intensive nationwide campaign in October, 1950, according to Dr. Martin Kaplan, chief veterinary officer of the World Health Organization. The antirabies campaign, which is being waged with the assistance of WHO, includes a mass vaccination of dogs with a new egg-adapted vaccine (Flury strain), which has proved harmless to dogs and seems to give greater immunity of longer duration than other vaccines so far produced. The number of rabies cases in animals has dropped from an average of 100 a year before the start of the campaign to 10 (1 bull, 1 jackal, and 8 unvaccinated dogs) in the course of the past 15 months. All dogs in Israel have been registered, and vaccinated animals have received suitable identification. All stray dogs are being destroyed, while newborn animals are vaccinated when they reach 6 months of age. Vaccination is compulsory and free of charge.

Although it is still too early to determine to what extent vaccination alone has brought about the fall in rabies incidence in animals, Dr. Kaplan believes that the concentrated attack has played an important part in this matter. The drop is mirrored also in the decline in human deaths from rabies, which were none in 1951, whereas they numbered 20 between 1948 and 1950. In addition, the number of persons receiving Pasteur treatment following dog bites, which averaged 4,000 a year before the start of the campaign, has been cut to about one-half.

The campaign, which will be continued for the next few years, is expected to serve as a demonstration of the most effective method of rabies control and to provide a guide for other countries where the incidence of rabies is high. At the same time, it is yielding valuable information on the vaccine in use, such as the duration of immunity conferred by it under field conditions. Laboratory studies have shown that one inoculation of the vaccine gives adequate protection for a minimum period of two years. No revaccination of dogs in Israel will be practiced until there are indications that the immunity in vaccinated animals is beginning to wane.

Of equal importance is the greater feeling of security now being experienced among the population of the agricultural settlements. Israel's Veterinary Services, in cooperation with the Ministry of Health, are in charge of the campaign, while the necessary vaccine is being supplied at present through the WHO but will be produced in Israel in the future. WHO technical guidance is being provided through Dr. Kaplan. On his last visit, Dr. Kaplan was accompanied by Dr. Ernest S. Tierckel, who was loaned to WHO by the United States Public Health Service, where he directs rabies control activities. Dr. Tierckel has just completed a three month survey of rabies problems in Northern and Southern Rhodesia, Ceylon, Iraq, Greece, and Israel for WHO.

Rh Blood Types in Jews in Jerusalem.—J. Gurevitch and his associates from the Hebrew University-Hadassah Medical School, Jerusalem, have just finished a study of the Rh blood types of Jews living in Jerusalem.

Relatively few studies have been reported on the incidence of the Rh factor in Jews. In 1945 Gurevitch found in a select group of 400 women from different parts of the country that 15% were Rh-negative. It was obvious that this figure could not be considered as representative of a population selected at random. In later studies of a larger series, similar results were found for Ashkenasi (11% Rh-negative) and Sephardi groups (11.8% Rh-negative), whereas a much lower rate of persons with Rh-negative type blood was found among Yemenites (2.3% Rh-negative) and Kurdistani-Persians (1.5% Rh-negative). No instances of hemolytic disease of the newborn infant have been observed among 310 Yemenite and 1,739 Kurdistani-Persian Jewish women at the time of delivery.

A total of 1,335 samples of blood were tested for Rh types in Jews in Jerusalem with the aid of the following serums: anti-rh′ (anti-C), anti-Rh_0 (anti-D), and anti-rh″ (anti-E). The subjects have been divided into three main groups: (1) Ashkenasi Jews, i. e., Jews of European descent, most of whom are from eastern European countries, (2) Sephardi Jews, descendants of Jews from medieval Spain, including Jews from North Africa (Algiers, Tunis, and Morocco), from southern Europe (Bulgaria and Greece), and an indigenous group from Israel, and (3) an Oriental group, including Jews from countries east of Israel (Iraq, Syria, and Afghanistan) but not from Persian and Kurdistani communities.

Percentage of Rh Types in Jerusalem Jews

Communal Group	No. of Persons	Types of Blood							
		Rh_1	Rh_2	Rh_1Rh_2	Rh_0	rh	rh′	rh″	rh′rh″
Ashkenasi	946	57.7	10.9	13.0	3.7	13.5	1.2	—	—
Sephardi	232	67.0	5.2	7.5	7.1	12.3	0.8	—	—
Oriental	137	64.3	10.2	7.3	4.4	13.1	0.7	—	—

In all three communal groups, the frequent occurrence of the Rh_1 (CDe) type was noteworthy, and this was especially true in the Sephardi group (67%) and among Oriental Jews (64.3%). Similar high percentages of Rh_1 type have been reported in Chinese and in Asiatic Indians. The rate of Rh_1Rh_2 among the Sephardi (7.5%) and Oriental Jews (7.3%) is low as compared with its rate in the Ashkenasi group of Jews and in other races.

The frequency of Rh-negatives (cde/cde) in this series was higher than that reported in previous studies and approached the rate for Rh-negatives reported for Europeans. It is noteworthy that the percentage of Rh-negative persons was similar in all three communal groups.

Convention of Psychiatrists in Haifa.—The Fifth National Convention of the Association of Neuropsychiatrists was held during May, 1952, in Haifa. It was disclosed at the gathering that, whereas the generally accepted figure of beds for mental cases is four for every thousand of the population, there are only 2,200 beds in Israel instead of the required 6,000. Generally speaking, the proportion of mental cases is higher in this country than in others, a fact that is accounted for by the large immigration (among which the proportion of mental cases is higher than average), the economic conditions that prevail locally, the overcrowding in dwellings, and the special difficulties encountered in new points of settlement, in *ma'baroth*, and in immigrants' camps. The hospitalization position for mental cases is catastrophic, a long time having to elapse before beds can be found for such patients. Suicides and acts of violence have been the result.

The convention voiced its demand for the establishment of work villages for chronic patients, labor camps for mental defectives, and a suitable home for epileptic patients, there being no such thing in the country at present.

Cardiovascular Research Unit.—The newly established cardiovascular research unit of the Hadassah University Hospital is headed by Dr. K. Braun. At a meeting of the Jerusalem Medical Association in February, 1952, the first report on the results of cardiac catheterization in patients with mitral stenosis was delivered. The pertinent findings were a rise in arteriovenous oxygen difference, a decrease in cardiac output and stroke index, a marked elevation of pulmonary arterial pressure, and some rise in right ventricular pressure. The competency of the right ventricle as an important factor in the production of paroxysmal pulmonary edema was emphasized.

At the meeting, Dr. A. M. Cohen of the Rothschild Hadassah Hospital reported on 18 patients with rheumatoid arthritis, bronchial asthma, and severe urticaria, who were treated by an intravenous drip of corticotropin. They found that a dosage of 1 to 3 mg. daily resulted in satisfactory clinical improvement. Unfavorable side-reactions were extremely few. The economical aspects of this treatment were stressed.

Dr. K. Braun discussed the effects of corticotropin on the pulmonary function in patients with bronchial asthma and obstructive emphysema treated by the above method. In the majority of patients, there was an improvement in the ventilatory functions of the lungs.

JAPAN

BCG Vaccination.—The annual tuberculosis death rate in Japan was around 200 per 100,000 population since 1900 showing a gradual decrease during the period 1925-1935. Although the highest peak was presented in the last war, the rate has decreased ever since 1947, dropping to 146.8 in 1950 and 111.1 in 1951.

The incidence of tuberculosis has been highest in the age group 15 to 29 as compared with that of the other groups. Almost all of these cases were of primary tuberculosis, proved by extensive studies clarifying the time of primary infection by means of repeated tuberculin testing on the nonreactors and the x-ray examination on the inverters. Indeed, nearly all of the pathological changes discovered through x-ray examination had appeared within one year after the positive inversion. As one of the chief measures for the prevention of the disease, stress was placed on the BCG vaccination of the tuberculin negative patients together with x-ray examination on the positive reactors.

The first attempt of BCG vaccination in Japan was made in 1930 on the student nurses by Prof. Arao Imamura of the Osaka University. In 1938, the National Health Administration Committee of the Japan Association for the Promotion of Sciences organized an antituberculosis committee, the chief object of which was to make a study of the testing method of tuberculin reaction and of the use of BCG vaccination. The results of the five year research of this committee were published in April, 1943, proving the safety and efficacy of BCG vaccine.

In the year 1942, the welfare ministry recommended vaccination for all children applying for a position after leaving the primary school. The number of vaccinated persons increased year after year chiefly among such groups as the 7 to 25 year age group, workers in offices and plants, students, and families of tuberculous patients, totaling more than 7 million within 1948.

The Vaccination Law was put in force in July, 1949. 1. All of the tuberculin negative reactors under 30 years of age were to be included in the mass vaccination program. 2. Selection of the group to receive vaccination was to be done by tuberculin testing. Five toxic units of old tuberculin were injected intracutaneously into the flexor surface of the forearm, and after a 48 hour reading, BCG vaccination was made on the negative reactors with local redness less than 9 mm. in diameter. 3. Choice of groups for revaccination were to be made in the same way as the above. The number of vaccinated persons in 1950 was 13,941,855.

Because of its strong local reaction, ulceration and abscess, the subcutaneous injection was replaced in 1940 by the intracutaneous method: that is, intradermal injection of 0.1 ml. of the vaccine containing 0.4 mg. BCG per ml. Meanwhile, studies on scarification and multiple puncture methods are in progress. For the compulsory vaccination, the dried vaccine is to be employed, the products of which are carefully assayed to insure the safety and efficiency of the vaccine. The production of frozen-dried BCG vaccine is conducted by the Antituberculosis Association and its production plants located in Tokyo, Sendai, and Osaka. The total production of the vaccine will amount to 45 million doses annually.

PARIS

Treatment of Status Asthmaticus with ACTH and Cortisone.—Since 1950, Prof. Pasteur Valéry-Radot, C. L. Laroche, and their associates have treated with corticotropin (ACTH) and cortisone 33 patients with severe status asthmaticus at the medical clinic of the Broussais Hospital. The patients remained under observation for three months with the following results. Seventeen patients experienced a functional recovery lasting for some weeks; several of these, formerly invalids, were enabled to resume their occupations, and four had no crisis for two to eight months; but in six asthma reappeared after a remission of two months. Two complete failures were noted. In favorable cases, signs of improvement were observed from the second or third injection (12 to 24 hours). Expectoration diminished or disappeared in 22 patients. Eosinophils disappeared from the second day of treatment. The authors began the treatment with 75 to 100 mg. of corticotropin daily in divided doses for three to eight days, the dosage being then diminished. The treatment lasted for 3 to 23 days. In nine patients it was supplemented with a few injections of cortisone, without any noticeable change in the results. In eight patients multiple cures were undertaken. Studies with Thorn's test (fall of the eosinophil level) were made on 19 patients, and in 10 cases only was a fall of less than 50% obtained. There was no parallelism between the fall in eosinophils and the degree of therapeutic improvement; five patients with negative tests had excellent results with hormonal treatment. As regards toxic incidents, no outbreak of hypertension was noted, but six patients experienced hypotonia with marked asthenia; to prevent this a daily dose of from 1 to 2 gm. of potassium chloride was given during the treatment. In order to avoid infections (three pulmonary infections having been observed) the patients were given 1 gm. of aureomycin daily. Three deaths occurred in the course of treatment; in one case, the patient showed signs of cardiac deficiency, and the treatment, giving no results, was discontinued after 775 mg. had been administered; the other two patients died in severe asthma on the 27th and 34th day of treatment. The autopsy of one of them revealed an obstruction of the bronchi by secretion. The authors believe that, because of the possibility of an aggravation of the patients' condition following discontinuation of the treatment, medical supervision is required during the period called "hormonal weaning"; moreover, corticotropin and cortisone do not modify the evolution of the disease, being only symptomatic medications, and, immediately on the disappearance of critical phenomena, the patient should be given etiological treatment.

Hyaluronidase in the Toxicosis of Nurslings.—The value of intravenous perfusion in the treatment of toxicosis of nurslings is indisputable, but there are technical difficulties as well as the deadly risk of pulmonary edema, owing to the difficulty of regulating the drip. The substitution of subcutaneous for intravenous administration failed to produce the anticipated results because of the too slow resorption of the serum. Professor Turpin and his associates report that 250 cc. of an isotonic sodium chloride solution with hyaluronidase, injected subcutaneously, is absorbed within 10 minutes, without pain or distention of tissues. No dressing of hyaluronidase is used, and no incident is to be feared; there is only one contraindication to be noted: a serious skin infection that might be spread by hyaluronidase. In a 14-day-old child, treated by an intravenous perfusion, an extensive, hard subcutaneous infiltration, feeling like cardboard, appeared 24 hours after the perfusion in the lower limbs. Hyaluronidase was administered and, paradoxically, succeeded in bringing about the resorption of the edema, a reduction of weight, and an improvement in the general condition. It appears, therefore, that hyaluronidase has a general regulating action on the water exchanges between circulation and subcutaneous tissues, but this hypothesis requires verification. In the other cases, the authors observed that, with perfusion with hyaluronidase, definitive success was

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obtained after failure of intravenous transfusion. They believe that intravenous perfusion will become a useless technique, save in the exceptional cases of collapse, and that subcutaneous perfusion may be substituted.

TURKEY

Activities of Institute of Hygiene.—The Ankara Refik Saydam Institute of Hygiene was established in 1932 with an initial budget of 700,000 Turkish pounds from a special fund provided by the Ministry of Health and Social Assistance. The Rockefeller Foundation gave an $80,000 grant, which was spent on scientific equipment for the microbiology laboratory, the institute's first building; a plaque in the hall commemorates the philanthropic gift. At present the institute has three main buildings, in which are located departments of microbiology and chemistry, serology, virology, pharmacodynamics, departments that study vaccines and bacterial vaccines, antigens, and control of disease, and a kitchen for the study of nutrition. A vaccination center was opened in 1947.

The scientific staff of the institute consists of 16 specialist physicians, 4 veterinarians, 8 pharmaceutical chemists, 52 laboratory assistants, and 41 technicians.

In the *Bulletin of Hygiene and Experimental Biology,* Dr. Niyazi Musa Erzin and Dr. Orhan Hulusi Balkan reported on the activities of the institute from 1933 to 1949. Research concerned such public health problems as malaria, tuberculosis, trachoma, brucellosis, food-carried diseases, insects and insect-borne diseases, cholera, plague, and epidemics that may be introduced from neighboring countries. Until 1934, smallpox and bacterial vaccines and serums were prepared in Istanbul, and much was imported. They are now prepared at the institute, and during the last war Turkey sent cholera and plague vaccines as gifts to Egypt and Far-Eastern countries. Smallpox and bacteria vaccines are prepared in two departments, and BCG vaccine in a separate division. Cholera vaccine is obtained from five different strains received from Basra, Pasteur Institute, Marseilles, Egypt, and Istanbul. In 1947, because of the cholera epidemic in Egypt, 9,256 liters of vaccine were prepared and 8,295 liters were distributed; that year the vaccine contained 4 to 8 million germs in 1 cc., and the whole population in the south and in the southeastern provinces of Turkey was vaccinated. In 1948, 6,344 liters were prepared and 6,165 liters were distributed. Plague vaccine is prepared from six different strains, three of these are of old Turkish origin and three originated in Cairo. In 1947 the production was 4,416 liters, of which 3,854 were distributed. Polyvalent dysentery vaccine is prepared from Flexner's Y and E Turkish strains from Bucharest and the Pasteur Institute, and Shiga's R and S strains. Production in 1948 was 254 liters, of which 148 liters were distributed. Antimeningococcus vaccine is prepared from different Turkish strains. Since the introduction of penicillin and the sulfonamides its production has been reduced. Production in 1948 was 78 liters, and 73 liters were distributed. Combined typhoid and paratyphoid A and B vaccines are prepared for prophylactic use from selected strains of high antigenic value: 1 cc. contains 500 million typhoid and 250 million each of paratyphoid A and B strains. Production in 1948 was 2,856 liters, of which 2,100 liters were distributed. The production of antipneumococcus vaccine, types 1, 2, and 3, has been discontinued since 1941 in favor of penicillin and sulfonamides. From 1933 to 1948 BCG vaccine was prepared for oral administration only. The 1948 production was 14,800 doses, of which 7,309 doses were distributed. In 1948, 370 cc. of BCG vaccine for intracutaneous injections were prepared and distributed. The production of pertussis vaccine for prophylactic and therapeutic use was begun in a new laboratory during the latter months of 1948. It is prepared from Turkish and American strains and contains 1,000 million germs in 1 cc.; of 18 liters 3 liters were distributed. Staphylococcus vaccine is prepared from Staph. albus, Staph. aureus, and Staph. citreus; 22 liters were prepared in 1948, and 13 liters were distributed. Brucella vaccine is prepared for therapeutic use; it is obtained from more than 30 strains of Turkish and foreign origin. There are 1,000 million germs in 1 cc.; the vaccine is preserved in a dry state. Nine liters were prepared in 1948. Rabies vaccine for distribution to the 82 rabies centers is prepared according to the Semple method; it contains 5% brain tissue. That vaccine used at the institute vaccination station is prepared according to the Högyes method; 815 liters were prepared in 1948, of which 752 liters were distributed. Smallpox vaccine, after passage through two calves, is given an additional passage through a young donkey to strengthen the virus; the results have been very satisfactory. The smallpox vaccination law, which has been strictly enforced for 67 years, requires that vaccination be given during the first six months of life; it is required on entering schools and military or civil service, and in the event of an epidemic the whole population of that locality is revaccinated. In 1948 3 kg. of smallpox virus stock were prepared, and 26 million doses were distributed. In 1948 over a thousand liters of typhus vaccine were prepared according to the Cox method, and as a precautionary measure, a substantial amount was forwarded to the provincial health departments. The production of polyvalent bacteriophage for the use of summer diarrhea amounted to 730 liters; 536 liters were distributed. Very good results have been obtained with bacteriophage therapy combined with sulfaguanidine. Combined vaccines prepared during 1948 were: typhoid-tetanus 6,360 liters; diphtheria-tetanus 8,250 liters; typhoid-typhus 4,288 liters; typhoid-diphtheria 70 liters; plague-cholera 13 liters; typhoid-cholera-typhus 100 liters.

The preparation of toxins and anatoxins in Ankara was begun in 1934. For the preparation of diphtheria toxin and anatoxin, modified Müller-Wadsworth medium is used. There were 998 liters of diphtheria toxin and 864 liters of anatoxin prepared in 1948. Tetanus toxin and anatoxin is prepared from Pasteur Institute and Stick Dorne strain; 1,173 liters of toxin and 309 liters of anatoxin were prepared in 1948. Scarlatina toxin is prepared from hemolitic streptococci grown on media modified after the Ramon method; 139 liters were prepared in 1948.

Until 1933, serums were prepared in Istanbul, but much was imported; this is no longer necessary. The institute has no farm yet, but there are modern stables for serum and experimental animals. For the preparation of serums, horses and oxen are used; rams, young donkeys, and, sometimes, goats are used for rabies serum. The animals are quarantined for 20 days; they are tested for glanders and other diseases and are given tetanus inoculations. For the immunization toxins, anatoxins, germ emulsions, and stock strains are used. Tetanus serum for prophylactic use is prepared from oxen. It contains 1,000 and 3,000 units in 1 cc. For therapeutic use it is prepared from horses and contains 3,000 units, 10,000 units, and 30,000 units in 1 cc. There were 803 liters prepared in 1948. Diphtheria serum for prophylactic use is prepared from cattle and contains 1,000 units in 1 cc.; for therapeutic use it is prepared from horses, and it contains 3,000 units, 10,000 units, and 30,000 units in 1 cc.; 495 liters were prepared in 1948. The suspension of the organisms used for the immunization of horses from which polyvalent dysentery serum O is prepared contains 50% Shiga's bacillus. The serum of animals that have a minimum of 300 units in 1 cc. is regarded as satisfactory. The finished product contains 3,000 and 10,000 units in 1 cc.; 247 liters were prepared in 1948. Meningococcus serum is prepared from four foreign and Turkish strains; 176 liters were prepared in 1947. With the introduction of penicillin and sulfonamides, its production has been greatly reduced. Scarlet fever serum production was 58 liters in 1948, and polyvalent gangrene horse serum production was 331 liters. Scorpion antivenom is obtained from horses immunized with toxin of a scorpion found in Turkey; during 1945 to 1948, 55 liters of it were produced and almost all were distributed. Of 92 liters of rabies serum prepared in 1948, 16 liters were distributed. There were 934 liters of antianthrax serum prepared in 1948, of which 430 liters were distributed. Normal serum is of two kinds: one is for oral administration, the other for use in bacteriology laboratories; 134 liters were prepared in 1948.

Antigens prepared during 1948 included: Wassermann antigen (Organ) 11,600 cc.; Kahn antigen 8,260 cc.; Sachs antigen, 1933-1938, 8,500 cc., since 1938 discontinued; hemolitic serum 2,540 cc.; tuberculin 3,700 cc.; metylic antigen, bovine and human type, 2,570 cc.; diluted metylic antigen 3,330 cc.; and brucellargen for Brucella allergy 400 cc.

CORRESPONDENCE

GASTRIC LESIONS OF LOEFFLER'S SYNDROME

To the Editor:—I am very much interested in the article in THE JOURNAL, June 7, 1952, entitled "Gastric Lesion of Loeffler's Syndrome," reported by Ruzic, Dorsey, Huber, and Armstrong, and the findings at operation. I have seen the same lesions of the stomach with the comparable roentgenologic observations due to aureomycin. When therapy with the drug had been discontinued after a period of five to six weeks, the stomach completely returned to normal.

In one patient who came under my observation in July, 1949, and who had been given a copious dose of aureomycin, on roentgenologic examination edematous, pseudopolypoid diffused changes were found. These changes were so severe that we were considering gastrectomy. The gallbladder could not be visualized. X-ray examination was again performed on Aug. 9, 1949, and there was a complete disappearance of these pseudopolypoid changes of the stomach. The patient was operated on at the Johns Hopkins Hospital on Sept. 7, 1949. A cholecystectomy was performed, and the stomach gave no evidence of any lesion at operation. Gastroscopy one month before had revealed no evidence of any changes in the gastric mucosa, and this was verified on Aug. 9, 1949, by a repeat x-ray examination of the stomach.

Could not the lesion described in this so-called gastric lesion of Loeffler's syndrome be due to the changes that can occur in the gastrointestinal tract in association with the intake of aureomycin?

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THE FUTURE OF OTOLARYNGOLOGY

To the Editor:—The editorial entitled "The Future of Otolaryngology," which appeared in the April 26 issue of THE JOURNAL, page 1508, was a true summary of the information now available in connection with otolaryngological practice today. However, more should have been said about meeting the challenge in spite of gloomy forecasts by some and bright predictions by others. It should be emphasized strongly that there always was, to a certain extent, the medical otolaryngologist whose chief interest lay in local rhinological and otological diseases (now allergic, psychosomatic, and dermatological) and the surgical otolaryngologist who quickly took up plastic surgery, bronchoesophagology, laryngoscopy, and even gastroscopy. Some mastered fenestrations, laryngeal surgery, neck dissection, esophageal surgery, and thyroid and cancer surgery; some also mastered ophthalmology and diseases of the chest.

Some of those who still practice the conventional field of otolaryngology, especially in smaller communities, call the surgeons "super-specialists," overlooking the greater opportunities available in our larger urban areas with the numerous postgraduate facilities.

I should like to call attention to part of a paper published by Dr. C. Gale in the *Eye, Ear, Nose and Throat Monthly* (**30**:601 [Nov.] 1951): "In the last few years otolaryngology has rapidly lost ground as a specialty. There are several reasons for this trend. The use of antibiotics and sulfonamide drugs has in great measure reduced the number of surgical procedures formerly commonplace. Surgeons who previously have boasted of using up a complete set of mastoid chisels every year, today rarely have the opportunity of doing a simple mastoidectomy. The general practitioner now armed with the newer antimicrobial agents has in large measure taken over the treatment of the acute and chronic infections of the sinuses, pharynx, and larynx. Even the fields of allergy, in all of its ramifications, have to a certain degree been taken from the specialist's domain by the introduction of the antihistamine drugs."

The above-mentioned author dwells on the reaction on the part of the otolaryngologist who was prompted to investigate and pick up all loose ends of his specialty. The first of the loose ends that became integrated into the specialty was plastic and reconstructive surgery. More important was the realization that the nose and throat surgeon could also be a head and neck surgeon, that there is nothing to prevent the otolaryngologist from doing cancer operations of the head and neck, thyroid surgery, or, for that matter, esophageal surgery. The importance of psychosomatic medicine is emphasized in the armamentarium of the specialty. Thus speaks an otolaryngologist in the largest city of our nation.

In conclusion, aside from expensive experimentation, especially in connection with private practice, there is no reason for anyone with surgical skill in certain techniques not to take up or advance in the various fields (unless handicapped by economic means). There is no reason for the nonsurgical physician to neglect such studies as allergy, audiology, physical medicine, and psychosomatic medicine. Besides, who prevents him from using the antibiotics and sulfonamide drugs? The various papers in the medical press and the excellent editorial of THE JOURNAL will do the problem more good than mere criticism or superficial suggestion.

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THE CERVICAL CAP

To the Editor:—I question the advisability of publishing such inconclusive articles on the delicate field of infertility as "The Cervical Cap in the Treatment of Male Infertility" (*J. A. M. A.* **149**:427-431 [May 31] 1952). The authors state that the use of cervical cap is unquestionably indicated. I question this, for they do not adequately describe relative semen inadequacy and they do not adequately describe the sequence of events that preceded the use of the cap. They state that decreased metabolic function in one or both partners or other endocrine disturbances were corrected promptly. I beg to point out that these disorders are not corrected promptly. Furthermore, 15 cases of primary sterility with conception achieved in 10 (67%) hardly warrants publication, particularly when only 7 of their successes are true oligospermia as defined by Dr. John MacLeod of Cornell University.

The authors state that ovulatory time is determined by the vaginal smear technique. Again, this technique has not been proved to determine ovulatory time in any manner satisfactory, accurate, or informative. Many disagree as to the time of ovulation as determined by this technique. Further, there is no control over the patient's practices at home. In summary, I question advocating the cervical cap in the cases described.

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PRESSURE TREATMENT OF MAXILLARY SINUSITIS

To the Editor:—Regarding the article "Pressure Treatment of Maxillary Sinusitis" by J. Mathews Robison in THE JOURNAL (page 436, May 31), I would like to say that this article is interesting and worth reading from the academic and philosophical viewpoint, but I doubt that it has any real practical application for the operating room.

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BUREAU OF MEDICAL ECONOMIC RESEARCH

THE COST OF LIVING AND MEDICAL CARE PRICES

Frank G. Dickinson, Ph.D.

In the past year, the index of the prices of all items in the consumers' budget has risen almost twice as many points as the price of medical care. The Consumers' Price Index rose 13.7 points in 1951, and the index of medical care and drugs rose 7.1 points. In 1951, the Consumers' Price Index reached an all-time high of 185.6 while the index of the prices of medical care and drugs stood at 155.0. While the Consumers' Price Index has been considerably higher than the index of medical care prices in recent years, the spread between the two indexes became even more pronounced during 1951. The Consumers' Price Index had risen 86% since the base period, while the cost of medical care rose only 55%. In terms of purchasing power of the consumer dollar, medical care was 16% cheaper in 1951 than in 1935-1939, that is, 155.0 is 84% of 185.6.

As explained in our earlier publications,[1] the Consumers' Price Index, which is compiled by the U. S. Bureau of Labor Statistics, measures monthly the changes since 1935-1939 in the prices of fixed quantities of goods and services normally purchased by moderate-income families in large cities. The indexes of the medical care items are a small part of the entire index. This index is considered our best general measure of the purchasing power of the consumer dollar and is widely used to determine wages in labor negotiations.

How have the prices of the individual medical care items behaved? As shown in the accompanying table, the index of medical care excluding drugs was 160.9 in 1951 and the index of prescriptions and drugs, 128.4. The index of physicians' fees (general practitioner, surgeon, and specialist) was 145.2; of general practitioners' fees, 145.2; and of surgeons' and specialists' fees, 144.3. The index of dentists' fees was 160.0 and of hospital rates, 260.7. The price index of group hospitalization, which was recently added to the items priced by the Bureau of Labor Statistics (December, 1950=100), was 103.1 in 1951; thus group hospitalization (Blue Cross premium rates) rose 3.1% during 1951, the first full year covered by this newly added index. Again, with the exception of hospital rates, the indexes of each medical care item were considerably below the Consumers' Price Index. In fact, if the hospital portion of the index of medical prices were excluded, this index would be even lower than the reported level of 155.0.

As the Bureau has previously pointed out, hospitals as buyers of large quantities of food and labor feel the full impact of inflationary forces. They must adjust their rates to cover the vastly increased cost of the materials they purchase. The hospital's costs are not stabilized by such customary accounting items as depreciation and taxes, because most hospitals are charitable institutions. The hospital index may also be uniquely affected by the choice of the base period. While 1935-1939 is considered a relatively normal period by most economists for the purpose of general comparisons, in the case of hospitals it may have some shortcomings. For example, the shortening of the nurses' working day to eight hours, which would considerably affect the labor costs of hospitals, was not fully realized until after 1935-1939. Other changes may have counterbalanced this factor. It is, of course, difficult to judge the appropriateness of a base period for individual items.

Although it is somewhat outside the scope of an article on prices, the decrease in the average length of stay in hospitals should be noted. While hospital rates have increased sharply, the decreased length of stay in hospitals has reduced the average patient's hospital bill considerably. If more information were available, it probably would be possible to make volume or quantity adjustments in the other medical care indexes—adjustments that would carry the discussion into the field of medical care expenditures and away from the topic of prices.

Consumers' Price Index and Price Indexes for Medical Care for Moderate-Income Families in Large Cities for 1949-1951 (1935-1939=100)

	1949	1950	1951
Consumers' Price Index (cost of living)	170.2	171.9	185.6
Medical care and drugs	144.9	147.9	155.0
I. Medical care, excluding drugs	149.7	153.1	160.9
A. Physicians' fees (general practitioner, surgeon, specialist)	137.9	140.0	145.2
1. General practitioners' fees	137.7	139.8	145.2
(a) Office visit	139.0	140.9	146.0
(b) House visit	131.4	133.9	138.3
(c) Obstetric case	155.6	157.3	167.3
2. Surgeons' and specialists' fees	138.4	140.6	144.3
(a) Appendectomy, adult	134.2	137.4	141.6
(b) Tonsillectomy, child	142.8	144.0	147.2
B. Dentists' fees	150.6	154.3	160.0
1. Fillings	150.9	154.5	159.5
2. Extractions	152.9	156.9	164.5
C. Optometrists' fees, eyeglasses	127.6	128.9	134.6
D. Hospital rates	226.8	235.3	260.7
1. Men's pay ward	253.5	265.5	297.2
2. Semiprivate room	221.7	229.6	253.6
3. Private room	207.7	213.7	233.7
E. Group hospitalization *	.....	.....	103.1
II. Prescriptions and drugs	123.3	124.8	128.4
A. Prescriptions	137.1	140.7	147.7

* December, 1950 = 100.

Source: for Consumers' Price Index, Monthly Labor Review, Bureau of Labor Statistics, U. S. Department of Labor, **74**:615 (May) 1952; for medical care price indexes 1949-1951, Indexes of Retail Prices of Apparel, Housefurnishings, and Services and Miscellaneous Goods to Moderate-Income Families in Large Cities, Quarterly Reports, Bureau of Labor Statistics, U. S. Department of Labor, March, 1950, December, 1951, and March, 1952.

The index of hospital prices is for room rates only. The prices of laboratory and other services are not sampled. The index of prescriptions and drugs does not cover any of the "wonder drugs" of recent years. Realizing the necessity for adding such items and for reflecting certain population changes, the Bureau of Labor Statistics has undertaken a thorough revision of its price index series. The data presented in this article have undergone an interim revision. The complete revision, however, will be presented in the indexes published in 1953. These data will have a new base period, 1947-1949. When the new indexes, which are expected to be more representative of today's cost of living, are issued, the Bureau of Medical Economic Research will present an explanation of the revision and a more complete analysis of medical prices.

Director, Bureau of Medical Economic Research.

1. Bulletin 62, Comparative Increases in the Costs of Medical Care and in the Costs of Living, 1948; Bulletin 66, The Cost and Quantity of Medical Care in the United States, 1948; Medical Care Prices vs. Cost of Living, J. A. M. A. **139**: 591 (Feb. 26) 1949, reprinted in Bulletin 67, Four Recent Articles on Medical Economics, 1949; Medical Care Prices vs. Cost of Living, ibid. **143**: 1198 (July 29) 1950, reprinted as Bulletin 76, 1950; Medical Care Prices and the Cost of Living, ibid. **147**: 258 (Sept. 15) 1951, reprinted as Bulletin 86, 1951; Bulletin 87, Medical Care Expenditures, Prices and Quantity, 1930-1950, 1951. All are publications of the Bureau of Medical Economic Research, American Medical Association.

BUREAU OF LEGAL MEDICINE AND LEGISLATION

MEDICOLEGAL ABSTRACTS

Blood: Admissibility of Evidence Relating to Blood Type.—The defendant was convicted on a charge of second degree murder and appealed to the supreme court of New Jersey. The defendant was accused of having stabbed the deceased through the heart with a bread knife and then pushing her through a plate glass window, and the issue arose as to whether the fatal wounds were actually caused by the knife or the broken glass. He was arrested and, prior to his trial, was examined by a physician associated with the Board of Health who extracted a specimen of blood for laboratory analysis to determine the presence or absence of venereal disease. The Board of Health, after making these tests, turned over to the police authorities an unused portion of the blood, which was analyzed by them to determine the defendant's blood type. On appeal, the defendant challenged the state's right to use his blood, which it is contended was taken against his will and without his consent, as evidence against him at his trial to show that it was of the same type as that found on the handle of the knife in question. The basis for this challenge was that such an act was a violation of the defendant's privilege against self incrimination, a denial of the process of law, an unreasonable search and seizure, and a violation of the state and federal constitutions.

The defendant alleged that he never gave his blood with the understanding that it was to be used against him at his trial for murder, and, before a consent to such use could be spelled out, the state must show affirmatively that he had full knowledge of all the facts when he permitted his blood to be taken. Although the identical question raised here has never been passed on in this state, said the supreme court, it has been decided in a recent Pennsylvania case. In that case the blood of the accused had been taken without his consent for typing, and he was subsequently convicted of assault and robbery with intent to commit rape. The defendant's blood type was presented at the trial, and objection was made that this violated the defendant's privilege against self incrimination. The Pennsylvania court said that in other jurisdictions it has been uniformly held that the constitutional immunity from self incrimination does not apply to a compulsory examination to determine the prisoner's physical or mental condition for the purpose of testifying in regard thereto, provided, of course, that he be not compelled to answer any questions propounded to him by those making the examination, since the purpose of the immunity is to prohibit the compulsory oral examination of the prisoner, either before or at trial, to prevent his being required to incriminate himself by speech or the equivalent of speech. Taking into consideration the origin and history of the rule of privilege against self incrimination, its scope and purpose and the protection to be afforded thereby, said the supreme court of New Jersey, we have no hesitancy in subscribing to the doctrine enunciated by the above case and other cases that permitted the use in evidence of photographing and fingerprinting and the results of mental examinations. The evidence relating to the defendant's blood type, concluded the court, was not a denial or invasion of the defendant's common law, constitutional, or statutory right or privilege against self incrimination. It was also contended that the taking of the blood against his will for the purpose of using it in evidence was a denial and an invasion of his rights against unreasonable search and seizure. It would seem, said the court, that after arrest is made the person of the accused may properly be examined without a search warrant in order to find evidence of his guilt and that such an examination would not be deemed an unreasonable search. The defendant's further contentions that the state's conduct also violated due process of law and the state and federal constitutions were also overruled, and the use in court of evidence of the defendant's blood type was approved. Accordingly, the judgment of conviction was sustained. *State v. Alexander, 83 A. (2d) 441 (New Jersey, 1951).*

MEDICAL MOTION PICTURES

Seizure: The Medical Treatment and Social Problems of Epilepsy: 16 mm., black and white, sound, showing time 45 minutes. Produced in 1951 by and procurable on loan from Presentation Division, Veterans Administration, Washington, D. C.

This film portrays the problems of a man in whom epilepsy develops following combat experience in the army. In spite of a prepossessing personality, an understanding wife, and other important advantages, his difficulty in holding jobs reduces him to despair and he returns to the Veterans Administration for help. The first 5 or 10 minutes of the film, and many of the later portions, are superb in their sincerity and emotional impact.

There is a scene near the end in which a rather immature physician is trying to comfort the defeated man and the physician seems unable to grasp what really has hurt and worried him. In trying to reassure his patient regarding the inheritability of epilepsy, he fails to emphasize one definite point that should always be made: that epilepsy resulting from physical trauma, chemical poisoning, and organic lesions is not inheritable. This would relieve the worries of a large group of patients, and he could go on to explain to the rest how the need for exact diagnosis justifies the formidable program of history taking, examining, and testing to which the patient is being subjected. At the end, the film bogs down entirely. Surely something has been learned by this time about safe occupations for persons with epilepsy in or out of institutions, and the vocational adjustments that have been found feasible should be suggested by a swift series of brief closing shots.

The photography generally is satisfactory. The animated sequences explaining causes of seizures are well done. The sound on the print reviewed was not consistently of high quality. As the film stands now, with its depressing close, it can be recommended to research workers in the medical and social sciences as a stimulus to better handling of the epileptic patient's problems. If it were provided with a positive, constructive ending it could be shown with telling effect to any mature audience, both lay and professional.

A New Beginning: 16 mm., black and white, sound, showing time 34 minutes. Presented by the United States Army with the cooperation of the Institute of Physical Medicine and Rehabilitation, New York University-Bellevue Medical Center, the United Mine Workers of America Welfare and Retirement Fund, the J.O.B. Committee. Produced in 1951 by Unity Films, Inc., New York. Procurable on purchase from United World Films, Inc., 1445 Park Ave., New York 29.

This documentary film tells the story of Charles Moore, a paraplegic coal miner, whose back was broken in a mine accident. After 10 years of helplessness and inactivity, the United Mine Workers Welfare and Retirement Fund provided means for his rehabilitation. The film shows how Moore, through long and arduous work at the Institute of Physical Medicine and Rehabilitation of the New York University-Bellevue Medical Center, manages to regain a remarkable degree of independence and usefulness. After his training is completed, he obtains a job, "working alongside other men," doing equal work for equal pay.

This is not a training film. Rather, it shows the layman and the physician uninitiated in physical medicine and rehabilitation the processes of rehabilitation in a general way. For that reason it does not cover the details of technique nor the professional aspects of the medical and surgical care of the paraplegic patient. It will be of value in inspiring any disabled person to attempt rehabilitation. The photography and narration are excellent. Except for the fact that it is a bit slow moving at the beginning and at times is overdramatized, the story is well told. The primary audience for this film is the disabled person, but it should also be of interest to any adult who is not familiar with the advantages of physical medicine and rehabilitation.

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MEDICAL LITERATURE ABSTRACTS

UNITED STATES

A.M.A. Am. Journal Diseases Child., Chicago

83:421-572 (April) 1952

*Herpes Simplex Virus as Cause of Fulminating Visceral Disease and Hepatitis in Infancy: Report of Eight Cases and Isolation of Virus in One Case. W. W. Zuelzer and C. S. Stulberg.—p. 421.
Corticotropin (ACTH) in Treatment of Acute Laryngotracheitis. J. A. Turner and E. A. Morgan.—p. 440.
*Kerosene Intoxication. R. B. Olstad and R. M. Lord Jr.—p. 446.
Accelerated Rehabilitation in Rheumatic Fever. A. J. Simon, I. Mack and P. Rosenblum.—p. 454.
Prematurity in the Negro Infant. E. P. Crump, C. Wilson-Webb and M. B. Pointer.—p. 463.

Herpetic Hepatitis in Infancy.—The virus of herpes simplex caused herpes viremia in five newborn infants who did not have pronounced cutaneous lesions. The diagnosis was supported by clinical evidence and postmortem studies, and by isolation and identification of the virus from the liver of one infant whose signs and symptoms were the same as those of the others. The clinical picture of this disease is determined in part by the portal of entry, which may be the conjunctiva, oral mucosa, or skin. Exposure may occur through placental transmission or during passage through an infected birth canal. A systemic reaction to the infection occurs on the fifth to seventh day of life, with temperature elevation or hypothermia, increasing jaundice, lethargy, respiratory distress, vomiting, dyspnea, cyanosis, circulatory collapse, and enlargement of the liver and sometimes the spleen. Characteristic symptoms are accumulation of yellow mucus in the pharynx, a severe bleeding tendency, and hypoprothrombinemia. The essential features of herpes lesions in the internal organs are necrosis and typical intranuclear inclusions. Even if maternal antibodies are present, premature infants are particularly susceptible to this infection, possibly because of a special susceptibility of embryonic tissues. Specific herpetic hepatitis was observed in three older infants (3 weeks, 22, and 18 months old, respectively.) The virus of herpes simplex might have invaded the blood stream of these infants during herpetic stomatitis. It is suggested that viremia is probably a frequent, if not a regular, phenomenon during primary herpetic infections of infancy.

Kerosene Intoxication.—Kerosene intoxication is reported in 71 infants and children. The amount of oil ingested was not always known, but the recorded amounts varied from 5 to 240 cc. Respiratory symptoms were found in all patients, gastrointestinal symptoms in 35, central nervous symptoms in 28, leukocytosis in 39, elevation of temperature in 53, and pneumonia in 29. Proteinuria and/or glycosuria was present in 37 of the 57 patients whose urine was examined. Roentgenograms were taken of 44 patients, 26 of whom had positive evidence of pneumonia in the lower lobes. In 19 patients with positive roentgenographic findings no positive auscultatory findings were recorded. In general, although the period of hospitalization was affected considerably by the presence of pneumonia and fever, it was proportional to the time that had elapsed from ingestion of kerosene to admission. The use of a stomach tube and copious lavage are recommended. The incidence of pneumonia was lower among the children who had vomited and had also received lavage. None of these patients died, but in 325 previously reported cases the mortality rate was 5.85%. Since most of these cases were due to accidental ingestion of kerosene in homes with kerosene stoves, a good preventive measure is instruction of families with this type of stove concerning its potential dangers.

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Titles marked with an asterisk (*) are abstracted.

A.M.A. Arch. Dermat. and Syphilol., Chicago

65:261-378 (March) 1952

Local Depilatory Action of Some Unsaturated Compounds. P. Flesch and M. Hunt.—p. 261.
Comparative Study of Histology and Cytology in Vesiculating Eruptions. L. H. Winer and C. E. Lipschultz.—p. 270.
Correlation of Emotional Status and Reactivity to Cutaneous Stimuli in Functional Dermatoses. M. E. Obermayer, R. Blair, C. Fiske and others.—p. 291.
Hidradenitis and Other Variants of Acne. H. A. Brunsting.—p. 303.
*Medical Aspects of Home Cold Waving. M. J. Brunner.—p. 316.
Natural Steroid Complex: Evaluation of Use in Collagen Diseases and Chronic Dermatoses. W. W. Duemling and M. Millman.—p. 327.
Bullous Eruption Due to Pediculosis Pubis. A. B. Kern.—p. 334.
Syringocystadenoma Papilliferum and Nevus Sebaceus (Jadassohn) Occurring as Single Tumor: Report of Case. J. L. Grund.—p. 340.
Effect of Cortisone upon Hypersensitivity Due to Lymphogranuloma Venereum. A. W. Grace, L. Frank and R. J. Wyse.—p. 348.

Medical Aspects of Home Cold Waving.—Almost all home cold wave solutions use ammonium or sodium thioglycolate, or mixtures of the two salts, in aqueous solution. Home cold wave solutions are not primary irritants under normal conditions, but irritant dermatitis can occur and is generally traceable to deviations in the method of application. Occasionally the wave solution is left on overnight without rinsing, or the suggested method of neutralization is incomplete. Irritant dermatitis of the hands from home cold wave solution is seen mainly after repeated contact without protection of the hands, as in women who give one or several home waves weekly to friends or relatives. In these subjects an ordinary "housewives' eczema" due to detergents may become exacerbated, or there may be maceration and exfoliation of the skin of the thumb and forefinger bilaterally, due to mechanical trauma incident to rolling up the plastic curlers while the skin is wet with waving solution. The dermatologist may be called on to investigate patchy or diffuse hair breakage, abnormalities in hair texture, or abnormalities in color or odor. Patchy hair breakage may result from excessively tight winding of the tress on the rod. Diffuse hair loss may result in bleached or otherwise damaged hair when failure to follow directions results in overprocessing, and it is occasionally seen following a severe eczematous dermatitis of the scalp. Discoloration of the hair after waving is seen almost entirely in women with dyed hair. Abnormal hair odor is due basically to inadequate application of neutralizer. The odor is particularly noticeable when the hair is rewetted and may be controlled by repeating neutralization. There were no authentic cases of systemic intoxication following percutaneous application of waving agents in the series covered by this report. Mild irritation may be expected after accidental entry of thioglycolate or neutralizer solutions into the eye, particularly if the agent is not flushed out with water.

A.M.A. Arch. Indust. Hyg. & Occup. Med., Chicago

5:311-414 (April) 1952. **Partial Index**

Studies on Toxicity and Skin Effects of Compounds Used in Rubber and Plastics Industries: I. Accelerators, Activators, and Antioxidants. F. S. Mallette and E. von Haam.—p. 311.
Toxicity of Sulfuric Acid Mist to Guinea Pigs. M. O. Amdur, R. Z. Schulz and P. Drinker.—p. 318.
Hazards from Thermal Decomposition of Motor-Insulating Materials. J. Sendroy Jr., J. D. O'Neal and G. C. Pitts.—p. 330.
Man, Submarines, and Carbon Dioxide. H. J. Alvis.—p. 344.
Disinfective Action of Methyl Bromide, Methanol, and Hydrogen Bromide on Anthrax Spores. R. W. Kolb, R. Schneiter, E. P. Floyd and D. H. Byers.—p. 354.
Influenza-Virus Vaccination in Industry. C. F. Yeager.—p. 365.
The Physician in Industry and the "Alcoholic" Worker. L. J. Wade.—p. 368.
Some Colloidal Properties of Inert Dusts. R. F. Hounam.—p. 375.
Concentrations of Particulates Found in Air. M. W. First and P. Drinker.—p. 387.

A.M.A. Arch. Otolaryngology, Chicago

55:261-404 (March) 1952

Allergy of Upper Respiratory Tract: Cure by Surgery Plus Antiallergic Methods. M. F. Jones.—p. 261.
Symptoms and Treatment of Pituitary Tumors. O. Hirsch.—p. 268.
Herpes Zoster of Cephalic Extremity. F. H. McGovern and G. S. Fitz-Hugh.—p. 307.
Management of Recent Nasal Fractures. S. Fomon, A. Schattner, J. W. Bell and others.—p. 321.
Response of Otosclerosis and Adhesive Otitis to Treatment with Corticotropin. N. Riskaer.—p. 343.
Anesthesia for Long or Technically Difficult Ophthalmologic and Otolaryngologic Surgical Procedures. D. C. Moore and J. F. Tolan. —p. 350.
Role of Allergy in Otology. R. E. Jordan.—p. 363.
*Pathology of Otosclerosis. H. Brunner.—p. 369.
Diagnostic Value of Latency Period After Caloric Stimulation of Vestibular Apparatus. E. Wodak.—p. 381.
Aberrant Salivary Gland Tissue in Tonsil Fossa. B. A. Sanderson. —p. 387.
Salivary Gland and Duct Calculi. J. H. Melant.—p. 389.

Pathology of Otosclerosis.—Based on a 25 year experience the author summarizes the present concept of the pathology of otosclerosis by distinguishing between preotosclerotic and otosclerotic changes as follows: The preotosclerotic changes consist of extensive degeneration of the cartilage at the frame of the windows, and overproduction of both precollagenous substance and primitive bone. The broadened marginal sheaths of the blood vessels that may be observed in the preotosclerotic stage, for which the term "blue mantles" has been coined by Manasse, consist of precollagenous substance. These changes are probably hereditary and do not produce clinical symptoms. They are called "preotosclerotic" for the following reasons: they are frequently associated with actual otosclerosis; they occur also without actual otosclerosis; they are not associated with other diseases of the bone of the labyrinth; and they are, as far as the "blue mantles" are concerned, distributed all over the petrous bone. The preotosclerotic changes turn to actual otosclerosis if there are signs of activity, i. e., definite osteoclasis and/or osteogenesis in these areas. By studying the biology of the otosclerotic focus in addition to its histological features, the author concluded that the actual otosclerotic nidus is a genuine tumor of the bone of the labyrinth capsule and shows various microscopic features according to the stage of activity. As in all tumors, the beginning of the disease is scarcely demonstrable. Although otosclerotic tumors have certain features in common with osteoid osteoma, they differ from these tumors in that they are not self-limited and do not grow by expansion, that is, by pushing aside the adjacent structures. The atrophy of the basilar portion of the cochlea, frequently associated with otosclerosis, is probably caused by the same (unknown) factor that causes the formation of the preotosclerotic changes.

A.M.A. Arch. Pathology, Chicago

53:197-280 (March) 1952

Some Local Factors in Restoration of Rat's Liver After Partial Hepatectomy: I. Glycogen; Golgi Apparatus; Sinusoidal Cells; Basement Membrane of Sinusoids. K. Aterman.—p. 197.
Id.: II. "Watery Vacuolation": Its Relation to Vacuolation of Anoxia. K. Aterman.—p. 209.
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Pathologic Lesions in Nervous System of Duck Fed Ration Deficient in Vitamin A. R. H. Rigdon.—p. 239.
Analysis of Hyperchromatism in Histologic Diagnosis of Carcinoma of Cervix Uteri, with Special Reference to Intraepithelial and Invasive Squamous Cell Carcinoma and Squamous Metaplasia. A. G. Foraker. —p. 250.
Senile Fibrosis of Stomach of Albino Rat. F. E. Shaffer and F. R. Dutra.—p. 257.
Extramedullary Lesions in Multiple Myeloma: Review of Literature and Pathologic Studies. D. W. Hayes, W. A. Bennett and F. J. Heck. —p. 262.
Vitamin-A Acceleration of Bone Growth Sequences in Hypophysectomized Rats. S. B. Wolbach and C. L. Maddock.—p. 273.

American Journal of Psychiatry, New York

108:641-720 (March) 1952

Psychological Response to ACTH, Cortisone, Hydrocortisone and Related Steroid Substances. H. P. Rome and F. J. Braceland.—p. 641.
Nor-Epinephrine-Like and Epinephrine-Like Substances in Psychotic and Psychoneurotic Patients. D. H. Funkenstein, M. Greenblatt and H. C. Solomon.—p. 652.
Lipoproteins in General and Cerebral Arteriosclerosis: Preliminary Report. A. Simon, J. W. Gofman, N. Malamud and others.—p. 663.
Recent Biochemotherapeutic Developments in Psychiatry. M. D. Sackler, R. R. Sackler, A. M. Sackler and J. H. W. van Ophuijsen.—p. 669.
The First Traveling Psychiatric Clinic in Quebec: Report of Experiences with One Year's Operation. G. E. Reed and A. Silver.—p. 676.
Sociological Motivations of Delinquency. P. W. Tappan.—p. 680.
Parental Deprivation and "Broken Home" in Dementia Praecox and Other Mental Disorders. J. E. Oltman, J. J. McGarry and S. Friedman. —p. 685.
Application of Principles of Child Psychotherapy in Residential Treatment. O. Krug.—p. 695.

American Journal of Public Health, New York

42:115-232 (Feb.) 1952. **Partial Index**

Civil Defense from a Health Officer's Viewpoint. H. D. Chope.—p. 115.
Federal Aspects of Health Emergency Planning. M. A. Pond.—p. 119.
Sanitation in Local Civil Defense Program. C. L. Senn.—p. 131.
Methods of Payment for Physicians' Services in Medical Care Programs. F. Goldmann.—p. 134.
Relation Between Recent Injections and Paralytic Poliomyelitis in Children. M. Greenberg, H. Abramson, H. M. Cooper and H. E. Solomon. —p. 142.
Association of Parenteral Injections with Poliomyelitis. R. F. Korns, R. M. Albrecht and F. B. Locke.—p. 153.
Public Health Aspects of Campaign Against Yellow Fever in Central America. N. W. Elton.—p. 170.
Further Studies of New Serologic Test in Tuberculosis. E. R. Maillard. —p. 175.
Food Plant Sanitation. P. E. Laughlin.—p. 182.

42:233-352 (March) 1952. **Partial Index**

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Id.: II. Epidemic Intelligence Service of Communicable Disease Center. A. D. Langmuir and J. M. Andrews.—p. 235.
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Coccidioidin Sensitivity Among School Children in Phoenix (Skin Test and X-Ray Survey). J. Emmett.—p. 241.
Multiple Screening. W. G. Smillie.—p. 255.
*Accidental Carbon Monoxide Poisoning Due to Domestic Gas Appliances and Gas Refrigerators: Problem in New York City and Its Control. J. B. Trichter and M. Helpern.—p. 259.
Measuring Quality of Medical Care Through Vital Statistics Based on Hospital Service Areas: I. Comparative Study of Appendectomy Rates. P. A. Lembcke.—p. 276.
Medical and Public Health Man Power. J. G. Wilson.—p. 287.

Carbon Monoxide Poisoning Due to Domestic Gas Appliances.—Carbon monoxide poisoning has increased in recent years as the result of incomplete combustion of illuminating gas in gas flame refrigerators. The users of gas flame refrigerators are not generally aware that such appliances require periodic adjustment and servicing. They may appear to be operating satisfactorily, without odor, and with a gas flame of the proper color, and at the same time may be discharging dangerous amounts of carbon monoxide. Spot surveys of water-cooled refrigerators in New York City, now fueled with mixed gas and formerly supplied with manufactured gas, have shown that they may be a grave hazard. Of 330 water-cooled refrigerators tested, 156 (59%) were producing dangerous amounts of carbon monoxide. Of 745 air-cooled models, 304 (41%) were operating improperly or were producing dangerous amounts of carbon monoxide. These tests were carried out after the change from manufactured to mixed gas. Carbon monoxide poisoning from gas refrigerators usually occurs more slowly than poisoning due to other gas appliances. With the slow accumulation of carbon monoxide in the blood, the victim usually has headache, dizziness, and muscular weakness. Even before mental confusion develops, the victim may become nauseated and vomit. Mental confusion and helplessness becomes extreme. The victim staggers about; he may overturn furniture and injure himself on broken utensils, frequently leaving a trail of blood stains. In many cases the circumstances give rise to a suspicion of homicide. Health departments and medical examiners' offices should assume leadership in combatting carbon monoxide poisoning resulting from use of gas appliances in the home, and the resources of all official agencies should be utilized.

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Am. Practitioner & Digest of Treatment, Philadelphia

3:265-348 (April) 1952

*Treatment of Temporal Arteritis and Other Vascular Headaches: Use of Procaine Infiltration and Surgical Excision. J. W. Fleming and L. A. Grossman.—p. 265.
Pediatric Problems of Prognostic Importance. W. M. Block.—p. 272.
*Use of Anion-Cation Exchange Resin in Edematous States Contraindicating Mercurial Diuretics. M. M. Best.—p. 274.
Clinical Implications of "Infantile Personality." H. H. W. Miles, H. C. Shands and S. Cobb.—p. 280.
Some Diagnostic Problems of Pleural Effusions. J. B. Andosca.—p. 285.
Effective Therapy of Severe Penicillin Reactions with Sodium Dehydrocholate: Clinical Studies of Liver Dysfunction—XII. L. Pelner and S. Waldman.—p. 293.
Prescribing Physical Treatment in General Practice. O. F. von Werssowetz.—p. 297.
Clinical Physiology of Kidney. G. E. Wakerlin.—p. 302.
Use of Experimental Suppositories in Treating Refractory Migraine. E. E. Reisman Jr.—p. 308.
"Restricted Activity." W. T. Gibb Jr.—p. 311.
Management of Carcinoma of the Female Breast. L. M. Trauner.—p. 315.

Treatment of Vascular Headaches.—Two patients, aged 70 and 57, with the uncommon clinical syndrome termed "temporal arteritis" are described. This syndrome is characterized by severe throbbing headache, swelling, and often nodularity of the temporal artery, with erythema of the overlying skin and pain on mastication. There is usually a systemic reaction, with temperature elevation, malaise, muscular aching, anorexia, and weight loss. Blindness due to involvement of the retinal artery may occur in one-third of the cases, as it did in one of the authors' two patients. The pathological picture is one of panarteritis, with necrosis of the media and formation of granulomatous tissue containing foreign body giant cells and epithelioid cells. The intima becomes thickened, and thrombosis is sometimes present. Blindness persisted, but all other manifestations subsided after an illness of two months' duration in the older patient. In the younger patient complete relief of pain and headache promptly followed periarterial infiltration with 1% procaine hydrochloride. It was necessary to repeat this procedure several times, the relief obtained lasting six to eight hours. Nevertheless increasing erythema and brownish discoloration were noted over the right temporal artery, and brief periods of irrational behavior were observed. A 2 cm. segment of the right temporal artery was then excised. Microscopic study of the vessel showed only thickening of the intima. Recovery was considered complete, since the patient remained asymptomatic during a two year follow-up period. Five additional patients are described who were between the ages of 23 and 44 years; they had vascular, usually unilateral, headache of relatively localized origin, with an afebrile course. A small area of hyperesthesia was observed over a segment of the temporal or other extracranial arteries. This headache was dramatically relieved by periarterial procaine hydrochloride infiltration. It is concluded that infiltration with procaine hydrochloride is a valuable therapeutic aid in treating certain headaches, regardless of their etiology. Surgical excision of segments of involved extracranial arteries may be indicated in some cases.

Treatment of Edema with Anion-Cation Exchange Resins.—Of eight patients with moderate to severe edema in whom organic mercurial diuretics were ineffective or contraindicated, seven were treated with a mixture of anion and cation exchange resins of the carboxylic type. This mixture contained approximately 12% anion exchanger, 29% potassium cycle cation ion exchange resin, and 59% hydrogen cycle cation exchange resin. One patient received two types of cation exchange resins; she was first given a resin consisting of 80% ammonium cycle and 20% hydrogen cycle and later the hydrogen-potassium cycle resin. Each resin was administered in equally divided amounts at 10 a. m., 3 p. m., and bedtime to a total of 45 gm. per day. The anion-cation exchange resin mixture was effective in restoring responsiveness to organic mercurial diuretics in three of five patients. The two unresponsive patients may have had edema unassociated with sodium retention. Typical symptoms and electrocardiographic changes suggestive of potassium depletion developed in the patient in whom the two types of cation exchangers were used. Acidosis and over-depletion of sodium and potassium are the commonest hazards associated with the use of any cation exchange resin. In one patient with intercapillary glomerulosclerosis, the cation resin administered alone caused such a rapid decrease in the carbon dioxide combining power that its further use was considered inadvisable. The anion-cation mixture resulted in less acidosis and better control of edema. The presence of renal disease need not be considered an absolute contraindication to resin therapy. Periodic laboratory determinations of serum sodium, potassium and chloride levels, and carbon dioxide content or combining power, are desirable in all patients and essential in those with preexisting renal disease. It would seem that the use of cation exchange resins, as adjuvants to an anion exchanger, will assume a prominent place in the management of selected cases of edema, since sodium depletion can be achieved and the action of organic mercurial diuretics potentiated or restored by the use of these resins.

Annals of Internal Medicine, Lancaster, Pa.

36:751-932 (March) 1952

*Effect of Cortone and ACTH on Histopathologic Lesions of Rheumatoid Arthritis. B. M. Norcross, L. M. Lockie, A. G. Constantine and others.—p. 751.
Benign and Pathologic Albuminuria: Study of 600 Hospitalized Cases. S. E. King and C. Gronbeck Jr.—p. 765.
Mechanism Involved in Polyneuritis as Exemplified by Postdiphtheritic Polyneuritis. M. R. Brown.—p. 786.
Effects of Intravenously Administered Veratrum Viride in Hypertensive and Normotensive Subjects. A. P. Shapiro and E. B. Ferris.—p. 792.
Comparative Study of Effects of Veratrum Viride and Tetraethylammonium Chloride in Hypertension. A. P. Shapiro, A. A. Brust and E. B. Ferris.—p. 807.
Choice of Precordial Leads in Diagnosis of Coronary Artery Disease. M. Pomerance, J. B. Hoffman and G. J. Ashe.—p. 811.
*Diffuse Interstitial Fibrosis of Lungs. E. H. Rubin, B. S. Kahn and D. Pecker.—p. 827.
Hemopneumothorax: Reëvaluation of Treatment. G. A. Beatty and R. W. Frelick.—p. 845.
*Nocardiosis: Three Case Reports. I. L. Bernstein, J. E. Cook, H. Plotnick and F. J. Tenczar.—p. 852.
Cardiac Asthma: Its Pathogenesis and Response to Aminophylline. C. Schuman and H. G. Simmons.—p. 864.

Effect of Cortisone and Corticotropin on Lesions of Rheumatoid Arthritis.—Muscle biopsies were performed on 30 patients with rheumatoid arthritis prior to and during hormone therapy. Both inflammatory and degenerative lesions were found in the muscles of 18 of the 30 patients, but in only 11 did the changes seem suitable for the evaluation of hormonal therapy. In 8 of the 11 patients there was definite improvement in both types of lesions following administration of cortisone (cortone®) and corticotropin (ACTH). The inflammatory nodules disappeared in five and were improved in the other three patients. Degenerative muscle changes improved less than the inflammatory lesions in eight patients. The greater response of the inflammatory lesions seems understandable in view of the short periods of treatment. Subcutaneous rheumatoid nodules were altered considerably in the 12 patients in whom they were studied during the period of hormone administration. Many small nodules almost disappeared, while the large nodules became smaller, less painful, and less inflamed. There was a definite histological change in two of the three patients from whom comparable nodules were removed before and during therapy. Synovial inflammation decreased in both patients in whom articular biopsies were performed before and during hormone therapy. No delay occurred in the clinical healing of the surgical wounds of this group of patients during cortisone or corticotropin administration.

Diffuse Interstitial Pulmonary Fibrosis.—In 1944 four cases were reported of a disease characterized by relatively sudden onset of dyspnea, cough, cyanosis, elevation of temperature, and early signs of cardiac decompensation. Death resulted within a short time from acute asphyxia or heart failure. At postmortem examination the lungs contained diffuse interstitial fibrotic changes. One similar case had been described in 1940 and subsequently reported cases, including the one reported here, bring the total to 14. The patients included six men and eight women ranging in age from 21 to 68 years. The main symptoms were cough, expectoration, hemoptysis, chest pain, fever, dyspnea, and

cyanosis. In a few cases the onset was insidious, but in most it was acute. With the appearance of dyspnea and signs of heart failure, the disease progressed rapidly, with death resulting from suffocation or cardiac decompensation. The duration varied from one month to three and a half years. Clubbing of fingers and toes was noted in several cases. Miliary, nodular, or mottled infiltrations, involving diffusely both lungs, were seen frequently, and often were associated with conglomerate areas of consolidation and occasionally pleural effusion. The differential diagnoses included tuberculosis, atypical pneumonia, chronic pulmonary infection, pulmonary edema with pneumonia or cardiac disease, pulmonary manifestations of systemic disease, such as blood dyscrasia, amyloidosis, and allergic conditions, as well as metastatic neoplasm. In the case described here roentgenographic findings suggested sarcoidosis. At autopsy diffuse interstitial fibrosis of both lungs was found. The progressive nature of the disease was indicated by the presence of different stages of the fibrotic reaction in various parts of the lungs. Associated cardiac enlargement affected chiefly the right heart. It is suggested that the disease is caused by a virus. Recovery may take place in some cases, but this cannot be proved, since the diagnosis depends on a complete autopsy.

Three Cases of Nocardiosis.—Nocardiosis is an acute or chronic infectious disease of granulomatous or suppurative nature, caused by an aerobic, gram-positive, inconstantly acid-fast species of Actinomycetaceae. Nocardia asteroides is the organism most frequently isolated. The authors add 3 cases to the 43 recorded in the literature. In case 1 the diagnosis was established before death, but treatment was ineffectual. Whether the preexisting silicosis predisposed to nocardiosis can only be conjectured. Case 2 illustrates the frequent association of pulmonary and neurological manifestations; in contrast to case 1, antemortem studies failed to reveal the etiological agent. The third patient was cured, and there has been no evidence of recurrence during a four year follow-up. The similarity of the signs and symptoms to those of pulmonary tuberculosis was striking. Since nocardiosis may mimic pulmonary tuberculosis, it is important to know that fragmented acid-fast mycelia in sputum may be mistaken for Mycobacterium tuberculosis. In the cases reported to date, the organisms have been more sensitive to sulfadiazine than to antibiotics. Surgical drainage should be employed when indicated.

Annals of Western Medicine & Surgery, Los Angeles

6:131-194 (March) 1952

Management of Gastric Ulcer. W. H. Bachrach.—p. 145.
*Baseball or Mallet Finger. L. Cozen and A. Waxman.—p. 154.
Infectious Mononucleosis and Guillain-Barré Syndrome: Report of Case with Recovery. W. F. Owen Jr.—p. 156.
Struma Ovarii: Report of Case. E. A. Pearson.—p. 157.
Psychosomatic Aspects of Early Postoperative Ambulation. N. Shure. —p. 159.
Varicose Veins: Part VII. Differential Diagnosis of Varicose Ulcers. A. Fields.—p. 162.
Medical Malpractice: What About Experimentation? E. L. Cady Jr. —p. 164.
Systematic Approach to Identification of Toxic Organic Compounds Isolated from Tissues and Fluids: Part III. Aquo-Ferriate and Stannic Chloride Tests. C. J. Umberger and A. Stolman.—p. 171.
Management of Gastric Hemorrhage and Hematemesis. R. G. Majer. —p. 175.
Domiciliary Care of Epilepsy. J. W. Shuman.—p. 179.

Baseball or Mallet Finger.—Avulsion of the distal attachment of an extensor tendon may result from a blow to the tip of the finger, forcing the finger into sudden flexion, or of a blow to the dorsum of the finger, injuring the extensor aponeurosis of the distal phalanx. A chip of bone may be detached with the end of the tendon. The trauma may be caused by a ball striking the end of the finger (hence the term "baseball finger"), and another name for the condition is "mallet finger." Two closed methods of treatment have been described. One is to place a long splint, such as a Lewin splint, on the finger with both interphalangeal joints extended. Usually, however, since the flexor tendons are so much stronger than the extensor tendons, the splint fails to keep the extensor relaxed enough to effect a union of the torn aponeurosis. The other, described by Smillie and by Watson-Jones, employs a plaster cast. This is applied to the finger with the proximal interphalangeal joint flexed and the distal interphalangeal joint extended. It has great merit theoretically, but unfortunately, the cast has the disadvantage of sliding on the finger. The method with which these authors obtained good results in all of nine cases in which it was used utilizes a very short splint, which must not extend proximally farther than the interphalangeal joint. This joint will remain flexed, since a finger that is not used is constantly in the position of relaxation, in this case, flexion. Thus the goal of Smillie and of Watson-Jones is achieved in that the proximal interphalangeal joint is in flexion while the distal interphalangeal joint is in extension. Since the splint is short, it can be worn with little discomfort for the eight weeks necessary to insure union of the aponeurosis. The patient's comfort is increased by removal of the splint at two week intervals. The only one of the nine patients who did not obtain full extension did not start to wear the splint until three weeks after injury, yet even he obtained a satisfactory result.

Blood, New York

7:289-386 (March) 1952

Studies on Platelets: III. Absence of "Selective Sequestration" and Destruction of Platelets by Spleen in "Idiopathic" Thrombocytopenic Purpura. M. Stefanini, J. B. Chatterjea, W. Dameshek and others. —p. 289.
Metabolic Displacement of Folic Acid by Aminopterin: Studies in Leukemia Patients. M. E. Swendseid, A. L. Swanson, S. Miller and F. H. Bethell.—p. 302.
*Nutritional Status of Folic Acid in Persons with Leukemia and Its Possible Relation to Effects of Aminopterin Therapy. M. E. Swendseid, A. L. Swanson, M. C. Meyers and F. H. Bethell.—p. 307.
Roles of Prothrombin Activity, Heparin-Protamine Titer and Platelet Concentration in Bleeding of Leukemia. G. Freeman and J. S. Hyde. —p. 311.
Certain Endocrine Influences Governing Leukocytic Response to Fever. W. L. Hubler, G. M. Higgins and J. F. Herrick.—p. 326.
Blood Destruction in Polycythemia Induced by Hypoxia. K. R. Reissmann, W. L. Burkhardt and B. Hoelscher.—p. 337.
Chronic Hemolytic Anemia Associated with Thalassemia and Sickling Traits. P. Sturgeon, H. A. Itano and W. N. Valentine.—p. 350.
Intravenous Use of High Molecular Ferric Carbohydrate Compound in Treatment of Hypochromic Anemia. J. E. Lucas and A. B. Hagedorn. —p. 358.
Drying of Hemoglobin. W. E. Smith and R. B. Pennell.—p. 368.
Effect of Dextran on Blood Typing and Crossmatching. P. Roche Jr., R. A. Dodelin and W. L. Bloom.—p. 373.
Influence of Dimethylaminoazobenzene on Leukocyte Production in Rat. J. S. Dinning, L. D. Payne and P. L. Day.—p. 376.

Folic Acid in Leukemia.—Reports on the use of metabolic antagonists of folic acid in leukemia revealed that in some patients a partial, temporary remission follows the administration of a folic acid antagonist. These remissions occur for the most part in patients with acute leukemia, particularly those in the younger age group, whereas the results of treatment in chronic leukemia are in general unsatisfactory. Moreover, in patients with chronic leukemia, the administration of an antagonist is usually accompanied by early severe toxic manifestations such as erythema, stomatitis, hemorrhage, and anorexia. Therefore, it appears that a general systemic factor that determines the individual response to folic acid antagonists must vary in different types of leukemia. It seemed possible that the metabolic availability of folic acid itself might be such a factor, and an attempt was made to determine the nutritional status with respect to folic acid in cases of chronic and acute leukemia. Folic acid excretion following test doses of the vitamin was measured in 31 cases of leukemia. Evidence was obtained that depletion of body stores of folic acid occurs in many cases of leukemia. It is suggested that the patient with leukemia has an increased requirement for the vitamin due to his hypermetabolic state, or perhaps more precisely, to the production of large numbers of immature leukocytes with relatively high folic acid concentrations. Since patients with chronic leukemia more commonly show evidence of greater folic acid depletion than those with acute leukemia, it appears that duration of the disease may be a factor in exhausting tissue reserves of the vitamin. The degree of folic acid nutritional depletion seems related to the varying clinical results obtained with antagonist therapy in chronic and acute leukemia.

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Cancer Research, Chicago

12:165-242 (March) 1952

Numerical Proportions of Different Cells in Mouse Epidermis During Early Methylcholanthrene Carcinogenesis. B. Davibhadhana.—p. 165.
Effect of Irradiation on Universal Reaction in Cancer. R. L. Kahn, F. J. Hodges, I. Lampe and O. W. Doyle.—p. 170.
Effect of Irradiation on Universal Reaction in Polycythemia Vera. R. L. Kahn, W. H. Bullock and F. H. Bethell.—p. 176.
Differential Invasion of Embryonic Chick Tissues by Mouse Sarcomas 180 and 37. J. Kautz.—p. 180.
Incorporation and Turnover of Radiophosphorus in Mouse Mammary Tumors (dbrB and C3H). H. Albaum, A. Goldfeder and L. Eisler.—p. 188.
Progressive Microscopic Alterations in Livers of Rats Fed Hepatic Carcinogens 3'-Methyl-4-dimethylaminoazobenzene and 4'-Fluoro-4-dimethylaminoazobenzene. J. M. Price, J. W. Harman, E. C. Miller and J. A. Miller.—p. 192.
Tumor Incidence and Lethal Mutation Rate in Drosophilia Treated with 20-Methylcholanthrene. W. J. Burdette.—p. 201.
Comparative Effects of Various Steroids on Lymphoid Tissue of Rat. W. L. Money, J. Fager and R. W. Rawson.—p. 206.
Protective Action of Stock Diets Against Cancer-Inducing Action of 2-Acetylaminofluorene in Rats. R. W. Engel and D. H. Copeland.—p. 211.
Studies on Methylcholanthrene Induction of Tumors in Scorbutic Guinea Pigs. W. O. Russell, L. R. Ortega and E. S. Wynne.—p. 216.
Influence of Blockage of Nipples on Occurrence of Hyperplastic Nodules in Mammary Glands of C3H Mice. E. Fekete, C. C. Little and F. L. Richardson.—p. 219.
Neoplasia Induced in Rat Embryos by Roentgen Irradiation. J. G. Wilson, R. L. Brent and H. C. Jordan.—p. 222.
Comparative Uptake of Free Amino Acids by Mouse-Ascites Carcinoma Cells and Normal Tissues. H. N. Christensen and M. E. Henderson.—p. 229.
Inhibition of Pasteur Effect in Yeast by Tumor Extracts and Differences in Lability of Sulfur in Normal and Tumor Tissues. D. Ghosh and H. A. Lardy.—p. 232.
Failure to Observe Pentolysis by Serum of Rats Bearing Malignant Tumors. J. H. Roe, J. W. Cassidy, A. C. Tatum and E. W. Rice.—p. 238.

Industrial Medicine and Surgery, Chicago

21:147-196 (April) 1952. **Partial Index**

*Pole Top and Other Manual Resuscitation Methods—Comparison Study. A. S. Gordon, M. S. Sadove, F. Raymon and A. C. Ivy.—p. 147.
Sequelae in Case of Electric Shock. L. H. Cotter and B. H. Cotter.—p. 153.
Ultrasound and Industrial Medicine. H. O. Parrack.—p. 156.
Standards of Noise Tolerance. J. H. Sterner.—p. 165.
Industrial Loss of Hearing: Medical Aspects. C. S. Nash.—p. 171.
Medical Care in Surface Transportation Company. H. Brandaleone and G. J. Friedman.—p. 174.
Therapeutic Use of Oxygen in Industrial Medicine. T. W. Nale.—p. 179.
Use of Hemo-Irradiation (Knott Technique) in Eye Infections. D. F. Farmer, C. P. Sullivan and W. B. Sullivan.—p. 183.

Resuscitation Methods.—Gordon and associates studied resuscitation methods on five men made apneic by means of intravenous thiopental (pentothal®) sodium and *d*-tubocurarine chloride. In pole top resuscitation, the rescuer ascends to the victim. He secures his safety strap around the pole and places the victim astride it between himself and the pole. He encircles with his arms the waist of the victim, placing both hands on the abdomen, thumbs below the lower ribs and fingers touching. With his arms and hands, he compresses the victim's abdomen in an upward motion. At the finish of the stroke, the hands are cupped with the fingers depressing the abdomen under the rib margin. The pressure is quickly released and reapplied 12 to 15 times per minute. The pole top method of resuscitation gives adequate ventilation, and should be applied to linemen who are shocked on the poles. However, since the vertical position predisposes to peripheral stasis and circulatory embarrassment, and impedes drainage of fluids that may collect in the oropharynx, the victim should be lowered to the ground and one of the more efficient push-pull methods begun as soon as he can be placed in the prone position. Comparative tests of the manual resuscitation techniques revealed that push-pull methods are two to three times as efficient, as regards pulmonary ventilation, as either the push or the pull methods alone. For general purposes the arm lift, back pressure method (modification of the Danish Nielsen method) should be used, since it is easy to teach, can be performed by most operators for prolonged periods, and gives excellent pulmonary ventilation without circulatory embarrassment. Trained personnel should also be acquainted with the hip lift, back pressure and Silvester arm lift, chest pressure methods to be used as alternatives in special circumstances.

Journal of Clinical Investigation, Cincinnati

31:131-244 (Feb.) 1952

Hemodynamic Alterations in Acute Myocardial Infarction: I. Cardiac Output, Mean Arterial Pressure, Total Peripheral Resistance, "Central" and Total Blood Volumes, Venous Pressure and Average Circulation Time. E. D. Freis, H. W. Schnaper, R. L. Johnson and G. E. Schreiner.—p. 131.
Determination of Thyroidal and Renal Plasma I^{131} Clearance Rates as Routine Diagnostic Test of Thyroid Dysfunction. S. A. Berson, R. S. Yalow, J. Sorrentino and B. Roswit.—p. 141.
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Relationship of Plasma pH and Anion Pattern to Mercurial Diuresis. D. R. Axelrod and R. F. Pitts.—p. 171.
Relationship of Streptolysin S Inhibitor to Phospholipids in Serum of Human Beings and Experimental Animals. G. H. Stollerman, B. B. Brodie and J. M. Steele.—p. 180.
Alveolar-Arterial Oxygen Pressure Gradient in Anemia. J. M. Ryan and J. B. Hickam.—p. 188.
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Distribution of Sodium and Potassium in Man. N. Deane and H. W. Smith.—p. 197.
Distribution of Total Body Chloride in Man. N. Deane, M. Ziff and H. W. Smith.—p. 200.
Oxygen Tension of Tissues by Polarographic Method: IV. Skin Oxygen Tension vs. Arterial Oxygen Saturation; Relationship to Oxyhemoglobin Dissociation Curve. R. Penneys.—p. 204.
Comparison of Estimation of Basal Cardiac Output from Linear Formula and "Cardiac Index." H. L. Taylor and K. Tiede.—p. 209.
Some Structural Requirements for Prevention of Leukopenia Induced by Nitrogen Mustard. A. S. Weisberger, R. W. Heinle and B. Levine.—p. 217.
Immunochemical Study of Albumins of Serum, Urine, Ascitic Fluid and Edema Fluid in Nephrotic Syndrome. D. Gitlin and C. A. Janeway.—p. 223.
Spontaneous Fluctuations in Glucose Content of Hepatic Venous Blood in Resting Normal Human Beings. P. K. Bondy.—p. 231.
Agglutination of Sensitized Sheep Erythrocytes and Collodion Particles by Tuberculous and Normal Sera. C. A. Colwell and G. Pitner.—p. 238.

Journal-Lancet, Minneapolis

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What's Past Is Prologue. R. J. Anderson.—p. 176.
Antimicrobial Treatment of Pulmonary Tuberculosis. F. W. Pitts and C. W. Tempel.—p. 180.
Bronchography in Chronic Disease of Lung. R. M. Fawcett.—p. 185.
Routine Photoradiography in General Hospital: Its Place in Detecting Unsuspected Pulmonary Tuberculosis. S. Jacobs.—p. 189.
Emotional Problems in Tuberculosis. H. A. Wilmer.—p. 192.
Tuberculin Test as Evaluation of Future of Tuberculosis. J. B. Novak.—p. 198.
Report of Committee on Tuberculosis, American College Health Association. W. T. Palchanis.—p. 199.
*Prolonged Intercostal Nerve Block in Upper Abdominal Surgery. W. J. Puderbach and H. E. Shaftel.—p. 200.

Prolonged Intercostal Nerve Block in Upper Abdominal Surgery.—Pulmonary complications of upper abdominal surgery have been attributed to decreased respiratory excursion due to postoperative pain. Intercostal nerve block with 1 to 2 cc. of a stable solution of procaine and butyl aminobenzoate in a water miscible nonoily vehicle ("efocaine") was given a therapeutic trial for control of postoperative pain in 30 patients between the ages of 36 and 64. Of these 30 patients, 18 submitted to cholecystectomy, 1 to cholecystotomy, 1 to gastrectomy, 2 to mastectomy, 5 to operations for epigastric hernia, and 3 to operations for ventral hernia. Postoperative pain control was achieved to a high degree, permitting freedom of movement, deeper breathing, and coughing. Twelve patients had no local postoperative pain and required no narcotic or sedative medication. Fourteen had mild pain or were uncomfortable for the first 24 to 30 hours and required one to two doses of sedative medication. Three received three doses of sedative medication and one required five doses. The patients who had had intercostal nerve block received an average of 0.7 doses of postoperative medication as compared to 5.2 doses required by a control group of patients undergoing similar surgical intervention by the same surgeons. Local anesthesia lasted for from 8 to 21 days, the mean duration being 14.2. There were no local or systemic toxic manifestations. There was no interference with healing of the incision.

Journal of Neurophysiology, Springfield, Ill.

15:87-162 (March) 1952. **Partial Index**

Projection of Cortical Area 6 to Brain Stem in Monkey. E. W. Peterson and D. S. Bickers.—p. 87.
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Splanchnic Afferent Pathways in Central Nervous System. O Aidar, W. A. Geohegan and L. H. Ungewitter.—p. 131.
Distribution of Potentials Following Stimulation of Olfactory Bulb in Cat. C. M. Berry, W. D. Hagamen and J. C. Hinsey.—p. 139.

Journal of Pediatrics, St. Louis

40:269-404 (March) 1952

Ameliorative Effect of Antibiotics on Nonlipoid Reticuloendotheliosis (Letterer-Siwe Disease) in Identical Twins. H. R. Bierman, J. T. Lanman, K. S. Dod and others.—p. 269.
Flush Method for Blood Pressure Determinations in Newborn Infants. D. Goldring and H. Wohltmann.—p. 285.
Clinical Report on Amebiasis in Infants Under One Year of Age. C. Goldenberg, W. H. Shlaes and S. Mintzer.—p. 290.
Evaluation of "Seton" Procedure in Treatment of Infantile Communicating Hydrocephalus. H. J. Svien, J. G. Love, H. W. Dodge Jr. and H. M. Keith.—p. 298.
Hereditary Ectodermal Dysplasia of Anhidrotic Type: Report of Case in Negro. B. F. Metson and B. K. Williams.—p. 303.
Congenital Entero-Umbilical Fistula Due to Patent Vitelline Duct. H. E. Scalettar, M. M. Mazursky and H. Rascoff.—p. 310.
Experimental Glutamic Acid Treatment in Mentally Retarded Children. V. Oldfelt.—p. 316.
Bacteriostatic, Germicidal, and Sanitizing Action of Quaternary Ammonium Compounds on Textiles: II. Sanitization of Cotton Fabrics. M. A. Latlief, M. T. Goldsmith, J. L. Friedl and L. S. Stuart. —p. 324.
Infantile Cortical Hyperostosis: Report of Case Responding to Treatment with Corticotropin. L. G. Bush and O. E. Merrell.—p. 330.
Duplication of Stomach. H. F. Berg and K. Marx.—p. 334.
Case of Perforated Gastric Ulcer Manifested by Hematemesis in 8-Week-Old Infant. E. B. Rubell, F. Leix and R. A. Clelland.—p. 337.
Improved Examining Pad for Infants. G. E. Stafford.—p. 339.

40:405-538 (April) 1952

Acute Phase Reactants: I. Serum Nonglucosamine Polysaccharides in Patients with Rheumatic Fever and Related Conditions. V. C. Kelley. —p. 405.
Id.: II. Serum Hexosamines in Patients with Rheumatic Fever and Related Diseases. V. C. Kelley.—p. 413.
Tables for Predicting Adult Height from Skeletal Age: Revised for Use with Greulich-Pyle Hand Standards. N. Bayley and S. R. Pinneau. —p. 423.
Incontinentia Pigmenti: Report of Three Additional Cases. A. B. Loveman, M. T. Fliegelman, A. I. Weidman and C. R. Rein.—p. 442.
*Selenium and Dental Caries: Investigation Among School Children of Oregon. D. H. Hadjimarkos, C. A. Storvick and L. F. Remmert. —p. 451.
Gastric Response of Normal Children to Urecholine. J. A. Jones, B. Margolis and T. Potterfield.—p. 456.
Variations in Blood Pressure in Hospitalized Children. G. W. Clayton and J. G. Hughes.—p. 462.
Treatment of Pinworm Infection (Enterobius Vermicularis) with Egressin. R. F. Goddard and H. W. Brown.—p. 469.
Intestinal Obstruction in a Premature Infant Treated by Resection and Primary End-to-End Anastomosis. C. W. Bierman, J. K. Davis and F. C. Biehusen.—p. 474.
Internal Prolapse of Sigmoid Colon in Infants and Children. J. M. Babich, F. Burns and C. P. Lynxwiler.—p. 479.
Primary Tuberculous Inoculation of Ear Lobe: Report of Unusual Case and Review of Literature. L. G. Morgan.—p. 482.
Generalized Congenital Phlebectasia. J. M. Humphries.—p. 486.

Selenium and Dental Caries.—Since "bad teeth" was reported to be one of the most pronounced symptoms in populations living in a seleniferous area, the authors of this paper decided to collect further data on the relationship between selenium and dental caries. Urinary selenium concentrations were determined in native-born school children reared in the counties of Clatsop and Klamath of Oregon where high and low rates, respectively, of dental caries were known to exist. Previous studies indicated that fluoride content of the drinking water, availability of dental services, and quantity of candy bars and carbonated beverages consumed were not the factors for the observed wide differences in caries incidence. A direct relationship was found between the prevalence of dental caries and the urinary selenium concentrations, suggesting that, in an as yet unknown manner, the trace element selenium may render the teeth more susceptible to caries.

Michigan State Medical Society Journal, Lansing

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Civil Defense is Self Help. M. L. Lichter.—p. 301.
Development of Program for Uniform Medical and Surgical Care in Disaster. R. M. McKean and R. J. Noer.—p. 303.
Psychiatric Viewpoint on Civil Defense. P. A. Martin.—p. 304.
Casualty Evacuation Plan. J. A. Witter and R. Aitman.—p. 310.
Shock and Hemorrhage. J. L. Posch and R. J. Noer.—p. 313.
Training of Blood Procurement and Distribution Teams. D. H. Kaump and E. R. Jennings.—p. 314.
Management of Burned Patients. J. L. Posch.—p. 318.
Treatment of Soft Tissue Injuries. D. A. Cameron, H. M. Smathers and A. M. Large.—p. 320.
First Aid for Simple Fractures. F. H. Purcell and G. V. Hendy.—p. 326.
Management of Chest Injuries from Atomic Bombing. D. W. Myers and W. M. Tuttle.—p. 329.
Trauma of Nervous System. E. S. Gurdjian and J. E. Webster.—p. 331.
Resuscitation and Anesthesia. F. E. Greifenstein.—p. 335.
Emergency Treatment of Genito-Urinary Tract Injury. G. E. Chittenden. —p. 336.
Emergency Care of Eye Injuries. W. S. Davies.—p. 338.
Ear, Nose and Throat—Emergency Treatment. J. E. Croushore.—p. 340.
Acute Radiation Injury. L. Berman, A. H. Price and L. D. Stern. —p. 341.
Blood Clotting Mechanisms and Acute Radiation Injuries. W. H. Seegers. —p. 344.
Industrial Medical Services and Civil Defense. A. F. Lecklider.—p. 345.
Public Health in Civil Defense. P. T. Salchow.—p. 346.
Formula Works. J. R. Hainline.—p. 348.

Nebraska State Medical Journal, Lincoln

37:93-136 (April) 1952

Leukemia Cases at the University of Nebraska Hospital: Statistical Analysis and Review of All Records of Leukemic Cases Treated at the University Hospital from Jan. 1933 to Jan. 1951. A. S. Rubnitz. —p. 95.
Value of Peritoneoscopy in Diagnosis of Obscure Abdominal Conditions. J. C. Kennedy.—p. 99.
*Surgical Treatment of Duodenal Ulcer: Comparison of Results of Treatment With and Without Vagotomy. G. Crile Jr.—p. 104.
Bronchogenic Carcinoma—Statistical Survey of Symptoms and Diagnostic Procedures. W. P. Kleitsch and W. Van Hazel.—p. 107.

Duodenal Ulcer With and Without Vagotomy.—During the past five years over 400 patients have been treated at the Cleveland Clinic by vagotomy and gastroenterostomy. Seven of the first 154 patients could not be traced, but the remaining 147 have been followed for from two to four years. Good results have been obtained in 90% of the patients followed. Another 3% have had no recurrence of ulcer symptoms, are better than before operation, but have side-effects of the operation or gastrointestinal symptoms arising from causes other than an ulcer severe enough to require some form of dietary or medical treatment. In 10 patients (7%) the results are classified as failures. The 90% of patients in whom satisfactory results were obtained are following no diet, taking no medicine, and are permitted to eat, drink, and smoke as they please. They have been informed that they no longer have the ulcer diathesis and that they can forget that they ever had an ulcer. The majority of these patients make the unsolicited comment that they have never felt better in their lives. A recurrence after vagotomy and gastroenterostomy can be dealt with by resection, with a mortality rate no higher than that of a primary resection, but there is no known cure for the gastric cripple who does poorly after a radical gastrectomy. Because the mortality rate of vagotomy and gastroenterostomy is less than 0.5% in over 400 cases, because the morbidity and incidence of side-effects are lower than with gastric resection, and because in 95% of the cases there is no evidence of recurrent ulceration for from two to four years after operation, Crile believes that vagotomy combined with gastroenterostomy is the best operation for patients with complicated duodenal ulcer.

New Orleans Medical and Surgical Journal

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Thrombosis and Embolism. W. H. Parsons.—p. 343.
Present Status of Military Psychiatry. R. E. Chambers.—p. 348.
"Spells" Causes and Diagnosis of Common Complaint. I. Stevenson. —p. 352.
Unusual Case of Carcinoma of Cervix. R. W. Dickenhorst.—p. 359.
Mental Health Angle in Obstetrical Cases. L. W. Rowland.—p. 360.
Adoption. J. K. Avent, D. S. Buell, G. S. Knox and others.—p. 365.
Systemic and Laboratory Investigation of Intraocular Disease. N. L. Hart.—p. 372.

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Oklahoma State Medical Assn. J., Oklahoma City

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Carcinoma of Thyroid Gland. P. J. Rosenbaum, H. C. Dodson and L. J. Starry.—p. 90.
Management of Acute Perforated Peptic Ulcer. W. P. Fite and A. H. Krause.—p. 93.
Herniated Intervertebral Disk, Indications for Morticed Bone-Block Fusion. E. D. McBride.—p. 100.

Postgraduate Medicine, Minneapolis

11:177-264 (March) 1952

Location of Mental Functions of Brain. L. B. Alford.—p. 177.
Bleeding Diverticula of Thoracic Esophagus. M. T. Friedell and E. J. Del Beccaro.—p. 182.
Surgical Principles Involved in Clinical Use of Streptokinase and Streptodornase. J. M. Miller and P. H. Long.—p. 188.
Use of Cortisone and Antibiotics in Resistant Pelvic Infections. A. Hurtig. —p. 196.
Postoperative Complications Due to Electrolyte Disturbances. R. Elman. —p. 202.
Review of 527 Mid Forceps Deliveries. J. R. Farrell and E. H. Dennen. —p. 210.
Acute Otitis Media. T. T. Smith.—p. 214.
Anemia in Pregnancy. K. E. Cox.—p. 219.
Technic for Intravenous Therapy in Infants and Children. S. L. Gans. —p. 235.
"Accidental" Ingestion of Poisons in Childhood. R. H. Alway.—p. 239.

Psychoanalytic Quarterly, Albany, N. Y.

21:1-152 (Jan.) 1952. **Partial Index**

Emotional Problem and Therapeutic Role of Insight. G. Zilboorg.—p. 1.
Psychoanalytic Theory of Instincts. T. S. Szasz.—p. 25.

Public Health Reports, Washington, D. C.

67:223-316 (March) 1952

The Health Department's Dilemma—Definitions and Functions. J. W. Mountin.—p. 223.
*Lead Poisoning in Young Children. H. Williams, E. Kaplan, C. E. Couchman and R. R. Sayers.—p. 230.
Mental Hygiene of Aging. P. V. Lemkau.—p. 237.
Sanitary Landfills in Northern States: Report on the Mandan, North Dakota, Project. R. J. Van Derwerker.—p. 242.
Tests of 2,4-Diaminopyrimidines on Toxoplasmosis. D. E. Eyles and N. Coleman.—p. 249.
Staining Treponema Pallidum and Other Treponemata. B. S. Levine. —p. 253.
National Program for Interstate Milk Shipments. L. A. Scheele and H. G. Hanson.—p. 260.
Mongoose Rabies in Puerto Rico. E. S. Tierkel, G. Arbona, A. Rivera and A. de Juan.—p. 274.
Expenditures of Health Departments in Large Cities. I. Seeman.—p. 279.
Morbidity Reporting—Basis of Communicable Disease Control. W. G. Smillie.—p. 287.
Units of Radiation and Radioactivity. E. E. Anderson.—p. 293.
Effect of Radioactive Materials on Environmental Health. C. P. Straub. —p. 298.

Lead Poisoning in Young Children.—Chewing of paint from cribs, toys, furniture, and window sills, and eating of painted plaster and fallen paint flakes causes lead poisoning in childhood. Putting things in the mouth, though normal in the first year of life, is abnormal if continued much later and is referred to as pica, or perverted appetite. Children of teething age living in old, run-down houses where lead paint has been used for years are especially likely to have lead poisoning. Weeks or months following repeated ingestion of small amounts of lead, there may appear irritability, fretfulness or disturbed gastrointestinal function, such as lack of appetite, constipation, vomiting or cramps; there may also be pallor as the result of secondary anemia. More severe intoxication results in lead encephalitis, which may terminate in death. Central nervous system involvement or encephalopathy, rarely seen in adults with lead poisoning, is common in children, whereas peripheral neuritis, a lead line on the gums, and colic are usually absent in children. A history of pica and examination of blood smears for stippling of the red blood cells are important aids in diagnosis. Porphyrinuria is frequently found, and the demonstration by roentgenogram of an increased density in the growing ends of the long bones is a cardinal sign of lead poisoning. The quantitative determination of lead in blood or urine is helpful in diagnosis. Williams and associates review the efforts made in the Baltimore City Health Department to diagnose and treat plumbism in infants. Education of the public combined with "lead consciousness" in physicians and pediatric clinics and with a blood-lead laboratory service has resulted in a marked increase in case recognition. It is hoped that education and the enforcement of measures regulating the use of lead-containing paints will result in a material reduction and eventual elimination of lead poisoning in children.

Texas State Journal of Medicine, Fort Worth

48:117-196 (March) 1952

Psychosomatic Medicine. W. P. Shelton.—p. 121.
Symptomatology of Achlorhydria. G. E. Clark Jr.—p. 125.
Infant Mortality in Texas. F. P. Helm.—p. 127.
Immediate Care of the Newborn Infant. R. E. Moon.—p. 128.
Conservation of Hearing in Children. J. Yates.—p. 133.
Rhinoplastic Submucous Resection. C. F. Engelking.—p. 137.

U. S. Armed Forces Med. J., Washington, D. C.

3:341-502 (March) 1952

Dextran Infusion in Normal Chinese Men. H. L. Chang, J. S. Chen, C. H. Chiang and others.—p. 341.
Delayed Primary Closures in War Wounds. C. A. Broaddus Jr.—p. 353.
*Effect of Cortisone on Frostbite Injury. A. R. Higgins, H. A. Harper, B. R. McCampbell and others.—p. 369.
Observations on Essentially Normal Young Men Treated with ACTH and Cortisone: II. Effects on Tuberculin, Dick, and Schick Tests. S. B. Appel, L. A. Fulton and K. D. Orr.—p. 373.
Treatment of Periodontal Disease. J. N. Obin.—p. 385.
Artificial Kidney. P. E. Teschan and M. E. McDowell.—p. 391.
Nongonococcal Urethritis. R. S. Graham.—p. 401.
Chronic Segmental Atelectasis. W. R. Beisel and J. O. Gillespie.—p. 407.
Sterilization of Footwear. J. D. Fulton and R. B. Mitchell.—p. 425.
Review of Tuberculosis Cases, United States Navy, 1949: Epidemiologic Implications. S. A. Britten.—p. 441.
Duodenal Ulcer in Military Personnel: Studies on Military Effectiveness of the Ulcer Patient: I. The Problem. E. D. Palmer and B. H. Sullivan Jr.—p. 455.
Treatment of Leukemia in Children. O. C. Bruton and W. S. Price. —p. 461.
Lymphoblastoma in Infant. M. Kurzrok and F. Marshall.—p. 469.
Traumatizing Foreign Body in Esophagus. R. T. Gantz.—p. 473.
Mediastinal Emphysema. W. E. Klein, W. H. Neil, J. B. Stotler and R. L. Eslick.—p. 479.
Pronestyl in Treatment of Ventricular Tachycardia. C. L. Leedham and W. H. Isham.—p. 487.
Fluid Balance in Pediatrics. F. C. Biehusen and C. W. Bierman.—p. 491.
Myocardial Infarction Following Electric Shock. L. E. Imboden and C. B. Newton.—p. 497.

Cortisone in Frostbite.—Inasmuch as no satisfactory treatment for frostbite in the stage after rewarming was available, the metabolic research facility studied the effect of cortisone. Patients were placed on a standard diet with a fixed calculated intake of calories, nitrogen, sodium, potassium, and phosphorus. Balance studies were conducted on these elements. Antibiotics were used when indicated, and physical activity about the ward was encouraged. The treated patients and controls were "paired" as to severity of injury as far as possible. The treated group of eight patients received 100 mg. of cortisone in one intramuscular dose daily. Because no satisfactory placebo was found, none was used in the untreated group. Cortisone exerted no significant clinical effect on the progress of the frostbite injuries; no significant metabolic effects were noted in the treated group.

Virginia Medical Monthly, Richmond

79:177-232 (April) 1952

Rehabilitation of Tuberculous Patient. A. R. Dawson and B. B. Bagby Jr.—p. 179.
New Technique for Radiation in Carcinoma of Cervix. G. Cooper Jr. and J. N. Clore.—p. 184.
Contemporary Concepts in Diagnosis and Management of Epilepsy. I. S. Ztass.—p. 188.
Acne—Fifty Year Review. T. W. Murrell and T. W. Murrell Jr.—p. 198.
Silent Gallstone: Significance and Management. F. R. Whitehouse. —p. 202.
Changing Fashions in Treatment of Influenzal Meningitis. G. C. Hall Jr. and W. W. Waddell Jr.—p. 206.
Surgical Treatment of Glaucoma: Study of Seventy-Five Consecutive Cases. E. G. Gill.—p. 209.
Acute Shoulder Bursitis as Encountered in General Practice. J. B. S. Perrow.—p. 212.
Carcinoma of Second Breast: Case Report. G. J. Levin.—p. 216.

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Acta Medica Scandinavica, Stockholm

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Administration of Testosterone Propionate in Bronchial Asthma. H. Arnoldsson and U. Pipkorn.—p. 325.
Incidence of Spondylarthritis Ankylopoetica in a Norwegian County. H. Holst and P. F. Iversen.—p. 333.
Relationship of Vegetative Nervous System to Uremia, with Remarks on Pathogenesis of "Renal Rickets." L. Hess.—p. 339.
Interrelationship of Folic Acid and Vitamin B_{12} in Macrocytic Anemia Associated with Limitis Plastica. M. R. Beyers, W. C. L. Diefenbach, H. Mark and L. M. Meyer.—p. 351.
*Case of Arteritis Temporalis Treated with ACTH. H. P. Ostergård Kristensen.—p. 391.

Corticotropin in Treatment of Temporal Arteritis.—Temporal arteritis is characterized by chronic arteritis and periarteritis. Histologically it is manifested by formation of granulation tissue in the intima and media, with exudation in the adventitia and round-cell infiltration around the vasa vasorum. Postmortem microscopy of the arteries has now established that the lesion is a general chronic arteritis, as characteristic changes have been found in almost all the arteries of the body. Thus the lesion in the temporal arteries is to be regarded as the symptom that most frequently leads to the diagnosis. A woman, aged 71, with the typical symptoms of this disorder is described. For months she had had pains in the occipital region and lately also in both temporal regions. Her temperature was elevated. The temporal arteries were almost as thick as a pencil and of bluish color; they felt sclerotic. A segment of the frontal branch of the left temporal artery was removed, and it showed pathological changes. After several therapeutic measures, including administration of antihistamines and antibiotics, had proved largely ineffective, treatment with corticotropin was started and continued for about a month. The effect was prompt; the pain subsided, the temperature and sedimentation rate decreased, and the patient's general condition improved. When this therapy was discontinued, the temperature again increased and the sedimentation rate rose to the same level as prior to the institution of treatment, but the patient had no recurrence of pain. The author suggests that corticotropin treatment, possibly intermittent, combined with bishydroxycoumarin therapy, might improve the prognosis of temporal arteritis by preventing progression of the arteritis in some vital regions.

Brain, London

75:1-108 (March) 1952. **Partial Index**

Racemose Form of Cerebral Cysticercosis. E. R. Bickerstaff, P. C. P. Cloake, B. Hughes and W. T. Smith.—p. 1.
Factors Influencing Course of Regeneration and Quality of Recovery After Nerve Suture. S. Sunderland.—p. 19.
*Altered Consciousness Associated with Brain-Stem Lesions. M. Jefferson. —p. 55.
Intraventricular Medication in Catatonic Stupor (Preliminary Communication). S. L. Sherwood.—p. 68.
*Neurological Manifestations of Idiopathic Hypoparathyroidism. J. A. Simpson.—p. 76.

Altered Consciousness in Brain Stem Lesions.—Jefferson points out that alterations of consciousness may arise from lesions of the brain stem and describes in detail six patients who had disturbances of consciousness associated with signs of mesencephalic disorder. The first patient had a history of nine attacks of pathological sleep, each lasting up to a week. Initially they occurred without focal signs, but later were associated with indications of disorder of function in the mesencephalic and upper pontine tegmentum. The causal lesion seemed to be an angioma. In the second patient disturbances had started two and a half years before, with variable bilateral ptosis. After a year there was a sudden episode in which consciousness was lost for an hour; simultaneously further ocular signs and rigidity of trunk and limbs developed, all indicating a disorder at the mesencephalic level. After this she remained torpid for a week. In subsequent months she had three similar attacks. The third patient had symptoms of mesencephalic derangement, including fixed pupils, ptosis, external ocular palsies, nystagmus, bilateral pyramidal and cerebellar signs, some disturbance of postural and vibration sense, and dysarthria, together with evidence of spontaneous subarachnoid bleeding. He was somnolent for three days, and lethargic a fortnight longer. There was incomplete recession of neurological signs. A congenital anomaly of blood vessels in the region of the upper brain stem was suspected. The symptoms in the fourth patient also indicated a midbrain tegmental lesion, which, judging from the family history, seems to be caused by angiomatous malformations. The fifth patient had two attacks (at an interval of 10 years) of midbrain disorder, the first known to have been associated with subarachnoid bleeding and the second presumptively so. In the second attack there was loss of consciousness for 36 hours followed by pathological drowsiness and resultant amnesia of five weeks' duration. A brain stem vascular anomaly seems likely. The sixth patient had a pulmonary infarct and a few days later had brain stem embolism. She was stuporous for 18 hours, and in a state of somnolence for a week, with clinical signs of a mesencephalic lesion. Physiological studies suggest that when parasomnic symptoms occur clinically with brain stem disorders, they indicate encroachment of disease on the reticular substance. This has to be proved or disproved by pathological study.

Neurological Manifestations of Hypoparathyroidism.—That deficiency of parathyroid hormone secretion results in hyperexcitability of the peripheral nervous system (tetany or spasmophilia) is well known, but the other neurological manifestations of the tetany syndrome are less familiar. This paper presents the histories of two patients with idiopathic hypoparathyroidism. The syndrome consisted of tetany, trophic ectodermal lesions, skeletal abnormalities, and biochemical changes in the blood. Both patients had hemitetany for several months before this sign became bilateral. There was no evidence of gross cerebral disease. In case 1 the child also had epilepsy, acute hallucinatory psychosis, mental deficiency, a transient choreiform state, separation of cranial sutures, and calcification of the choroid plexus at an unusually early age. The electroencephalogram in case 1 showed a diffuse slow rhythm that increased to alpha frequency (with occasional delta activity) when the serum calcium was restored to normal. In case 2 the electroencephalogram of an adult showed mild dysrhythmia that was probably within normal limits. Attention is drawn to headache, excessive muscle weakness, and fatigue as symptoms of incipient tetany. Tests for latent tetany are reviewed and their mechanisms discussed.

British Journal of Radiology, London

25:113-168 (March) 1952. **Partial Index**

ARTHROGRAPHY: SYMPOSIUM
I. Comparative Study of Arthrography of Knee Joint. P. P. Hauch. —p. 120.
II. Evaluation of Pneumoarthrographs. L. S. Borow.—p. 129.
III. Arthrography of Shoulder. D. H. Nelson.—p. 134.
IV. Peripheral Ischaemia as Basis of Joint Disease (Serial Angiography of Periarticular Blood Vessels. A. Leb.—p. 140.
Radiological Studies of Alimentary Tracts of Undernourished German Children. F. R. Bertridge and K. M. Prior.—p. 145.
Internal Irradiation of Antral and Mastoid Cavities. H. A. Hughes and R. H. Archer.—p. 152.

British Journal of Urology, Edinburgh

24:1-88 (March) 1952. **Partial Index**

Ectopic Openings of Ureter. T. Moore.—p. 3.
Ureteric Compression by Traction Diverticulum of Duodenum. A. W. Adams.—p. 19.
Cryptorchidism. T. W. Mimpriss.—p. 23.
Studies in Pyelorenal Backflow. J. A. Ross.—p. 27.
Umbilical Urinary Fistula. J. R. Cameron.—p. 39.
Restoration of Continuity of Ureter by Means of Polythene Tubing. W. S. Tulloch.—p. 42.
Biochemical Changes After Ureterocolic Anastomosis. A. W. Wilkinson. —p. 46.
Kidneys in Tourniquet Shock, with Particular Reference to Circulatory Changes (Experimental Study). S. R. Mukherjee.—p. 52.
Carcinoma of Rete Testis Occurring 10 Years After Orchidopexy. C. Dundon.—p. 58.
Arterial Supply of Male Urinary Bladder. J. L. Braithwaite.—p. 64.

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British Medical Journal, London

1:615-670 (March 22) 1952

Professional Prospects: Comparison of Position of Doctors with That of Other Professional People. R. Lewis.—p. 615.
Hormone Assays in Normal and Abnormal Pregnancies. G. I. M. Swyer. —p. 619.
Changes in Basal Metabolism, Serum-Protein-Bound Iodine, and Cholesterol During Treatment of Hypothyroidism with Oral Thyroid and *l*-Thyroxine Sodium. J. D. Robertson and H. F. W. Kirkpatrick. —p. 624.
Persistent Urinary Salmonella Dublin Carrier with Bilharziasis. W. S. Miller.—p. 628.
Balantidiasis in South Persia. A. G. McCarey.—p. 629.
Exchange Transfusion in Severe Anaemia. T. Ward.—p. 631.
Homolateral Pyramidal Signs with Tumours of Posterior Fossa. L. C. Oliver and J. R. Gibbs.—p. 634.

1:671-724 (March 29) 1952

Some Medical Aspects of Tobacco-Smoking. R. B. Scott.—p. 671.
*Retrolental Fibroplasia: Problem of Prematurity. B. A. Bembridge, M. Coxon, A. C. L. Houlton and others.—p. 675.
Depression of Tuberculin Sensitivity in Guinea-Pigs by Certain Anti-tuberculous Surface-Active Agents. P. D. Hart, D. A. Long and R. J. W. Rees.—p. 680.
*Tuberculosis in Families with B.C.G.-Vaccinated and Non-Vaccinated Children. A. W. Dickie.—p. 682.
Head-Dropping Test. R. Wartenberg.—p. 687.
Side Effects of Preparation of Vitamin B_{12}. P. D. Bedford.—p. 690.
"Epidemic" Abdominal Colic Associated with Steatorrhoea. M. E. M. Thomas.—p. 691.
Death Following Barium Enema in a Child with Hirschsprung's Disease. A. Jolleys.—p. 692.

Retrolental Fibroplasia.—A team from the Oxford Eye Hospital, the pediatric department of the United Oxford Hospitals, and the Nuffield Laboratory of Ophthalmology has been concerned in a joint investigation of retrolental fibroplasia since June, 1950. All prematurely born babies of low birth weight were subjected to routine ophthalmologic examinations. The infantile optic disk is always extraordinarily pale, and the central fundus often has a patchy distribution of pigment. The retinal periphery constantly has a peculiar edematous-looking greyness, gradually merging into the pinkness of the posterior fundus. These appearances have been seen in both full-term and premature babies, and they gradually disappear during the first weeks of life. The periphery of the infant lens is often doubly refractile, and this may lead one to suspect a detachment of the retina when in fact there is none. The authors are sure that diagnosis of retrolental fibroplasia cannot be made without the presence of a retinal detachment or thickening, or of some retrolental mass near the periphery. In addition to these signs engorgement of the retinal vessels and formation of "fans" of new vessels from the retinal vessels, often coming forward into the vitreous in front of the thickened or detached retina, are important diagnostic points. They do not regard retinal vascular dilatation alone as sufficient to warrant a diagnosis of retrolental fibroplasia. A total of 22 cases of retrolental fibroplasia have been observed at the Oxford hospitals since 1947. The authors gave corticotropin by intramuscular injection in four doses daily, totaling 20 to 25 mg., to six infants with retrolental fibroplasia and felt that the disease was arrested by this treatment. Despite gross intraocular damage, many of the eyes retain sufficient vision to enable the child to avoid obstacles and to walk about unaided. Excision of the eye is unnecessary, and is to be avoided in view of this possibility.

Tuberculosis in Families with BCG-Vaccinated and Non-Vaccinated Children.—Many workers have reported surveys demonstrating the protective value of BCG vaccine, but others found little evidence to support this view. The problem of carrying out controlled investigations to cover all possible variables has made it difficult to assess its true value. A search was made for families in which some children had been vaccinated with BCG and others had not, and which had been exposed to a known source of tuberculous infection. This paper presents data on 16 families with 22 vaccinated and 22 nonvaccinated children. The source of infection, while not the same for all children, was at least similar. When the source of infection was in the home, it may be assumed that each child was exposed to the maximum possible risk. The social conditions, especially overcrowding, varied between families, but the children in each family lived under the same conditions and their standard of nutrition tended to be the same. The reason that some of the children were vaccinated and others were not was probably that the mother was offered vaccination for some of the children on one particular occasion, for example, at a school medical examination, a child welfare center, or a maternity hospital, but did not trouble to have the remaining children vaccinated. Primary tuberculosis developed in 21 of the 22 children in the nonvaccinated group. In the BCG-vaccinated group, two at most showed some evidence of superinfection. The protective value of BCG vaccination is striking, both when the source of infection is within the family (with the maximum risk for each child) and when it is outside. The difference in the incidence of tuberculosis in the vaccinated and nonvaccinated children admitted to a hospital is recorded. The absence of tuberculous meningitis and miliary tuberculosis in the vaccinated group is noted.

Deutsche medizinische Wochenschrift, Stuttgart

77:413-444 (April 4) 1952. **Partial Index**

Progress in Gastroscopic Diagnosis of Gastric Carcinoma. H. Stollreiter. —p. 415.
*Methionine Tolerance as Liver Function Test. K. Schreier and H. Schönsee.—p. 418.
*Does Cytodiagnosis Signify Progress in Early Diagnosis of Malignant Tumors, Particularly in Carcinoma? H. J. Mohr and A. Többen. —p. 420.
Present Status of Treatment of Crural Ulcer and of Varicose Veins. F. Jaeger.—p. 422.
Chemotherapy in Tuberculous Diabetic Patients. G. Vieth.—p. 425.

Methionine Test for Liver Function.—Amino acids, particularly methionine, are increased in the serum of patients with liver damage. This suggests that it is difficult for the damaged liver cell to metabolize or store methionine. In preliminary tests the authors determined that after a tolerance test with methionine the serum of patients with liver disease showed higher methionine values than the serum of healthy persons. Since, however, determination of methionine in the serum requires complicated microbiologic or colorimetric tests, it was regarded as unsuitable for a routine liver function test. It was decided to determine the methionine level in the urine, especially since a simple as well as specific colorimetric method is available for this purpose, namely, the McCarthy-Sullivan reaction. The authors used this test in a modified form, which corresponded largely to a modification described by Horn, Johnes, and Blum. In this liver function test methionine is given by mouth, and its excretion in the urine is ascertained over the next 24 hours. Healthy adults excrete in their urine from 11.5 to 13% of orally administered methionine. The authors regard the elimination of from 15 to 19% as abnormally high and over 19% as definitely pathological. In children, excretion of over 15% is to be regarded as definitely pathological. The authors hope that, in view of the simplicity and cheapness of the test, it will find wide application.

Cytological Studies in Early Diagnosis of Malignant Tumors.—Since Mohr's report in 1949, he and Többen have been able to study an additional 317 cases in which carcinoma was suspected on clinical grounds by means of Papanicolaou's cytological technique. Gynecologic and bronchial carcinomas accounted for most of the cases. They found that under unfavorable conditions correct results will be obtained in 37% of the cases and under favorable conditions in 93%. Doubtful results are to be expected in from 3 to 28% of the cases and false diagnoses in from 2 to 25%. Caution is therefore necessary, since a negative or doubtful result never excludes the possibility of a carcinoma. Only because of its simplicity can the cytological method be regarded as an advance in the early diagnosis of carcinoma. Its use can be recommended in material that can be obtained by a direct smear. Indirectly obtained material, such as puncture fluids, gastric juice, or bronchial, or prostatic secretions, do not provide reliable results. Although the method provides helpful indications, it must be verified by biopsy. It must be used cautiously as a basis for therapeutic measures and for prognostic evaluation.

Glasgow Medical Journal

33:71-106 (March) 1952

*Total Colectomy. A. B. Kerr.—p. 71.
Value of Intermittent Venous Occlusion: Its Effect on Local Muscle Circulation as Determined by Clearance of Radioactive Sodium (Sodium 24). E. M. McGirr.—p. 83.
Failure to Influence Blood Coagulation Time by Sublingual Administration of Heparin. A. C. Kennedy and A. Brown.—p. 89.
Old-Time Quacks and Quackery. H. S. Carter.—p. 92.

Total Colectomy.—Kerr demonstrates on the basis of three case histories that total colectomy has a place in the treatment of both ulcerative colitis and familial polyposis; that with the aid of modern anesthesia, antibiotics, and blood transfusions the risks are not high; and that in the presence of a permanent ileostomy, life can be both useful and happy. The surgical program is a formidable one, and is usually carried out in three stages at intervals of about three months. The first stage consists of division of the ileum and formation of a permanent ileostomy. Removal of the distal ileum, cecum, ascending colon, transverse colon, and descending colon represents the second phase, and removal of the sigmoid colon, rectum, and anal canal the third phase. Discussing the management of ileostomy Kerr says that within a few days of the establishment of an ileostomy its products become less fluid, but they do not acquire the solidity seen with a sigmoid colostomy and cannot be satisfactorily managed with a simple dressing and belt. The problem for most patients is solved by the Koenig-Rutzen bag, a soft rubber bag attached to a rubber collar, which in turn is secured to the skin with a special adhesive solution. None of the patients had continuing distress in handling the ileostomy. Familial polyposis of the colon is the less controversial of the two conditions for which Kerr employed total colectomy. In this patient carcinoma developed low in the rectum so that there could be no conservation of the rectum or anal canal. The minimal operation therefore was excision of the rectum and sigmoid colon. Some would have advocated watching the remaining colon, but this would not have been safe, since the patient had extensive papillomas and continued to bleed from her colostomy. The two patients with ulcerative colitis raise the question under what circumstances ileostomy for ulcerative colitis should be followed by total colectomy. The indications in these two patients were the continued diarrhea and blood loss. The threat of carcinoma must also be considered, because the surviving epithelium at the margins of ulceration is shaggy, edematous, and often hyperplastic, changes which some regard as precancerous.

Journal of Pathology and Bacteriology, Edinburgh

64:1-256 (Jan.) 1952. **Partial Index**

Pathogenesis of Herpetic Encephalitis Following Corneal and Masseteric Inoculation. E. J. Field.—p. 1.
Focal Lesions in Skeletal Muscles and Peripheral Nerves in Rheumatoid Arthritis and Other Conditions. B. Cruickshank.—p. 21.
Effect of Sclerosis of Nerve Trunk on Ascent of Tetanus Toxin in Sciatic Nerve of Rabbits and on Development of Local Tetanus. J. H. Baylis, J. Mackintosh, R. S. Morgan and G. P. Wright.—p. 33.
Portal Circulation in Experimental Cirrhosis of Liver. P. M. Daniel, M. M. L. Prichard and P. C. Reynell.—p. 53.
Active Immunity in Mice Following Intranasal Injection of Sub-Lethal Doses of Living Haemophilus Pertussis. G. N. Cooper.—p. 65.
Effect of Antibiotics on Growing Cultures of Bacterium Coli. R. J. V. Pulvertaft.—p. 75.
Stimulation of Eosinophil Leucocyte. J. Vaughn.—p. 91.
*Significance of Atheroma of Renal Arteries in Kimmelstiel-Wilson's Syndrome. G. F. M. Hall.—p. 103.
Acute Necrotising Glomerulonephritis. J. D. Blainey.—p. 121.
Observations on Agglutination and Haemolysis of Red Cells Treated with Extracts of Mycobacterium Tuberculosis: Evaluation of Methods. A. W. Pound.—p. 131.
Renal Lesions in Leptospira Canicola Infection in Dogs. W. I. M. McIntyre and G. L. Montgomery.—p. 145.
Hyperplasia and Neoplasia of Sertoli Cell. A. L. Stalker and W. T. Hendry.—p. 161.
Recognition of Pathogenic Staphylococci: With Notes on Non-Specific Staphylococcal Haemolysin. J. Marks.—p. 175.

Atheroma of Renal Arteries in Kimmelstiel-Wilson's Syndrome.—The fact that more severe atheroma at a much earlier age develops in many diabetics than in the general population has been known for many years, but no particular significance appears to have been attached to excessive atheroma of the renal arteries in diabetics. It is the purpose of this paper to show that such atheroma may produce extensive structural changes in the kidney, which are of considerable significance in relation to Kimmelstiel-Wilson's syndrome. Two types of glomerular lesions occurring in diabetic glomerulosclerosis, the nodular lesion and the exudative lesion, are briefly described on the basis of the findings in a series of 135 diabetics. The clinical and postmortem findings in eight cases of Kimmelstiel-Wilson's syndrome in which death resulted from uremia are recorded. Gross atheroma with much narrowing of the renal arteries was present in all eight cases. Atheromatous involvement of the large and small branches of the renal artery gives the kidney a characteristic macroscopic appearance. The histological picture in all eight cases was distinctive, the predominant feature being ischemic obliteration of vast numbers of glomeruli. Atheroma of the renal arteries of comparable degree was seen in only one other case in which similar clinical and histological features were not present. In 43 other cases of diabetic glomerulosclerosis there was no evidence that the renal lesion, uncomplicated by renal artery atheroma, was responsible for death. The pathogenesis of the massive obliteration of glomeruli is discussed, and it is concluded that obliteration results from atheromatous narrowing of the renal arteries superimposed on severe arteriolosclerosis.

Lancet, London

1:623-678 (March 29) 1952

Surgery of Spleen. L. Whitby.—p. 623.
Splenectomy: Indications and Technique. R. Maingot.—p. 625.
Incidence and Mechanism of Early Dumping Syndrome After Gastrectomy: Clinical and Radiological Study. J. C. Goligher and T. R. Riley.—p. 630.
Routine Testing of Sensitivity of Bacteria to Antibiotics. J. R. May and C. W. Morley.—p. 636.
Treatment of Parkinsonism in a Child. J. W. Farquhar.—p. 638.
Studies in Aetiology of Pneumonia in Glasgow, 1950-1951. N. R. Grist, J. B. Landsman and T. Anderson.—p. 640.
Cat-Scratch Fever: Case in England. O. F. Garai.—p. 646.

Maandschrift voor Kindergeneeskunde, Leyden

20:37-68 (March) 1952

*Resection in Primary Tuberculosis. C. Dijkstra.—p. 37.
Therapy of Congenital Cataract. W. A. Manschot.—p. 52.
Corticotropin (ACTH) and Gold in Treatment of Lupus Erythematosus Disseminatus. J. Engelhardt.—p. 60.

Resection in Primary Tuberculosis.—Dijkstra discusses the indications for pulmonary resection in primary tuberculosis on the basis of five cases in which the continued discharge of tubercle bacilli indicated resection of the lung. Surgical treatment is rarely necessary in the beginning phase of the primary infection, because in most cases the pathological process seems to become arrested, although repeated sputum examination and gastric lavage may reveal the intermittent discharge of bacilli. In other cases there seems to be a long period of clinical arrest (from two to five years), after which the sputum cultures again become positive. Caseation of the lymph nodes with rupture into the bronchi, frequently associated with specific changes in the walls of the bronchi, was the commonest cause of the continued discharge of tubercle bacilli. In such cases conservative treatment is not adequate and resection is advisable. The sputum should be cultured frequently and over long periods in patients with primary pulmonary tuberculosis.

Medical Journal of Australia, Sydney

1:313-348 (March 8) 1952. **Partial Index**

Potassium Deficiency in Entero-Colitis in Infancy: Its Clinical Features, Treatment and Prevention. H. Williams.—p. 313.
Some Aspects of Pre-Eclampsia and Eclampsia. R. B. C. Stevenson.—p. 317.
"Pheniodol" Excretion: Observations on Urine of Patients with Hepatic Disease. C. R. B. Blackburn, H. L. Webster and D. K. Grant.—p. 321.
Value and Limitations of X-Ray Examination in Assessing Disease of Gallbladder. S. Goulston.—p. 323.

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Minerva Medica, Turin

43:189-210 (Feb. 2) 1952

*Disodium Salt of Congo Red and Streptomycin in Tuberculous Infections. G. Pescetti and E. Destefanis.—p. 189.
Thiosemicarbazone in Extrapulmonary Tuberculosis. G. Oppia.—p. 196.

Streptomycin Combined with Congo Red in Tuberculous Infections.—The failure of streptomycin to cure tuberculous infections has been attributed to the inability of the drug to penetrate and diffuse into the specific foci. To test this hypothesis, the authors combined streptomycin with congo red and obtained a double disodium salt that in vitro maintained, and sometimes enhanced, the antibiotic properties of streptomycin. In addition, because of phagocytosis of congo red, the antibiotic could penetrate and concentrate into the foci. Four groups of guinea pigs, of which one served as a control, were inoculated intraperitoneally with Mycobacterium tuberculosis. One month later one group was treated with intracardiac injection of congo red every other day, one group with intramuscular injection of 0.01 gm. of streptomycin in 1 cc. of isotonic sodium chloride solution every day, and the third with intramuscular injection of 0.01 gm. of streptomycin combined with 1 cc. of congo red every day. The experiment lasted 257 days, and the observation period after the treatment 135 days. All the control guinea pigs, all those that received congo red, and 25% of those treated with streptomycin died. There was no death among those treated with the salt. During the treatment reaction to tuberculin was positive in 90% of the animals treated with congo red, negative in 40% of those treated with streptomycin, and negative in all those treated with the salt. In some of these it became positive when treatment was interrupted. All the guinea pigs lost weight after the inoculation, regained it during treatment, and lost it again after the treatment was discontinued. Only those that were treated with the salt began to regain weight after a few days and exceeded their initial weight. The authors also made histological studies of these animals, and concluded that streptomycin combined with congo red arrests the infection and attenuates the toxic phenomena in tuberculous guinea pigs more than streptomycin alone. Moreover, if the infection reactivates after treatment is interrupted, it is a mild process with productive, fibrotic, and cicatricial tendencies. The authors, encouraged by these results, are now using the salt to treat patients with tuberculosis. The effects seem encouraging, but a definitive evaluation is still premature.

Philippine Medical Association Journal, Manila

28:61-104 (Feb.) 1952

Trial with Clostridium Tetani Toxoid in Inhibition of Malaria Relapse. J. B. Mendoza.—p. 61.
Fetal Salvage Through Prenatal Care. H. Acosta-Sison.—p. 67.
Report of Case of Left-Sided Homonymous Hemianopsia with Macular Sparing. P. de la Paz.—p. 74.
Acute Yellow Atrophy: Case Report. S. Sotto-Yuvienco.—p. 78.
Neglected Problems in Leprosy Control. C. B. Lara.—p. 82.

Presse Médicale, Paris

60:313-328 (March 5) 1952. **Partial Index**

*Remarks on Ligation of Inferior Vena Cava in Cardiac Decompensation; Results, Indications and Contraindications. C. Lian, H. Welti and F. Morgenthaler.—p. 313.
Nephritis After Ingestion of Mussels; Role of Allergy. M. Dérot.—p. 316.
General Anesthesia and Cerebral Surgery; Significance of Respiration Under Anesthesia. G. Lazorthes and L. Campan.—p. 319.
Study of Blood Volume in 60 Patients With Pulmonary Tuberculosis; Its Significance in Surgical Treatment. Cornet and Duhamel.—p. 322.

Ligation of Inferior Vena Cava in Cardiac Decompensation.—Ligation of the inferior vena cava was performed on 15 patients between the ages of 13 and 61 years with cardiac decompensation. There was no operative death. Immediate improvement of the respiratory embarrassment was obtained by all the patients, but despite immediate satisfactory results, one patient died from cardiac decompensation and uremia three weeks after the operation. Three patients died within the first three postoperative months; two of these patients had mitral lesions associated with asystole, and the third had asystole complicating persistent ductus arteriosus. Three additional patients died three, five and nine months respectively after the operation; two of these had mitral lesions associated with asystole, and one had cor pulmonale and angina pectoris. Of the eight surviving patients, two were still incapacitated four and six months after the operation. Satisfactory late results were obtained in the remaining six patients; two of them had no functional disturbance and resumed their normal activities five and three months after the intervention. The others were considerably improved, but the functional signs of their heart disease had not subsided completely. These results corroborated those reported by other workers, and showed that ligation of the inferior vena cava induces immediate improvement that may be followed by death within the first six operative months, while permanent improvement may be obtained by 50% of the patients operated on. Use of local anesthesia and a retroperitoneal rather than transperitoneal approach was considered responsible for the satisfactory results. Poor general condition is the only contraindication to the operation in young patients. Lesions of the aortic valve are not considered contraindications. Indications are most favorable in patients whose stasis is limited to the lungs; they are less favorable in those with stasis of the lungs and the liver, and least favorable in those with visceral stasis associated with edema. Ligation of the inferior vena cava should be considered even in a cardiac patient with mitral lesions and considerable dyspnea on effort in the absence of rales at the base of the lungs and of enlargement of the liver, after treatment with mercurial diuretics, salt-free diet, and thevetin has failed.

Revista Médica de Chile, Santiago

80:79-134 (Feb.) 1952. **Partial Index**

Treatment of Ectopic Testes. J. Zañartu and E. C. Hamblen.—p. 79.
*Regression of Pulmonary Metastases of Breast Cancer with Androgen and Estrogen Treatment. A. Lucchini and L. Vargas Fernández.—p. 94.
Aureomycin and Terramycin Treatment of Human Enteroprotozooses. J. Faiguenbaum, M. Miranda, A. Neghme and M. Agosin.—p. 99.

Regression of Pulmonary Metastases with Androgens and Estrogens.—The authors have treated more than 80 patients with breast cancer since 1944 with implants of androgens (methyltestosterone, testosterone propionate, and testosterone); 9 of the patients also had estrogen implants (diethylstilbestrol or hexestrol). A review of 64 of these cases showed that the patients had had 304 hormonal implants (252 of methyltestosterone), amounting usually to 300 mg. every three to four months (average duration of treatment, 24 months with a total dose of 1.07 gm. of hormone). Pulmonary metastases usually occur in the final stage of the disease and end in death within a short time. Fifteen patients, all past the menopause, in this series had pulmonary metastases; in 11, the response to hormone therapy was favorable. This exceeds the figures given by the Council on Pharmacy and Chemistry of the American Medical Association, which reports improvement in only 13% of such cases. Treatment was given for an average of 27 months to these patients, about 300 mg. of androgens being given every three to four months. Larger doses do not seem to give better results; length of treatment is more important than size of dose. Striking regression of pulmonary metastases was obtained in two cases with small doses of synthetic estrogen, 100 mg. per implant, a fact requiring further study. Average survival from start of treatment was 19.3 months, which is longer than generally reported (radiotherapy, 12 months; hormone therapy, 8.9 months). Most of the patients were treated with methyltestosterone, which may be more effective than other androgens in antitumoral properties, especially when administered parenterally. The change of hormones, or the influence of an estrogen following an androgen, may also have affected the favorable outcome; in many cases, improvement was observed after the antitumoral effectiveness of the androgen had been exhausted.

BOOK REVIEWS

Calculation of Industrial Disabilities of the Extremities. By Carl O. Rice, M.D., M.S., Ph.D., Clinical Associate Professor of Surgery, University of Minnesota Medical School, Minneapolis. Cloth. $10.50. Pp. 289, with 160 illustrations by Jean E. Hirsch. Charles C Thomas, Publisher, 301-327 E. Lawrence Ave., Springfield, Ill.; Blackwell Scientific Publications, Ltd., 49 Broad St., Oxford, England; Ryerson Press, 299 Queen St., W., Toronto 2B, 1952.

In this monograph the author has developed a detailed objective approach to the evaluation of industrial disabilities limited to the extremities. In the preface, it is stated that the information is intended to be of specific assistance to the physician in determining disability, a guide to the industrial commissioner in setting weekly indemnity values, and an aid to the insurance adjuster in estimating insurance reserves. The well-delineated table of contents and index provide easy reference to the subject matter.

In the opening chapter, there is a brief review of the methods used by Kessler, McBride, and others. To the author, it seems that methods for calculating disability that give unit values for pain, incoordination, adaptability, and similar intangibles are of little more value than a good guess and are accurate only in proportion to the experience of the physician who makes them. Dr. Rice states that it is his assumption that, when the useful range of motion is used as a basis for calculating disability, almost all other factors have already been given consideration.

The section dealing with relative values explains the protractor system used by the author in arriving at values for all of the joints of the extremities. He feels that it is the responsibility of the physician to determine the percentage loss of function in the involved member and that the industrial commission should render the award. A plea is made for standardization in the compensation laws, so that anatomic and functional values will be the same in all states.

The author implies that he recognizes the limitations inherent in any system of disability evaluation by stating that he is endeavoring to establish some degree of standardization in a field that almost completely defies it. This book should prove especially useful to those physicians who are called on to make only an occasional estimation of disability.

Dynamic Psychiatry. Edited by Franz Alexander, M.D., and Helen Ross. Cloth. $10. Pp. 578. University of Chicago Press, 58th St., and Ellis Ave., Chicago 37; Cambridge University Press, Bentley House, 200 Euston Rd., London, N.W.1, 1952.

This comprehensive volume consists of 16 articles written by 15 distinguished specialists and practitioners. Part 1 is concerned with theoretical concepts of dynamic psychiatry, such as development of fundamental concepts of psychoanalysis, dreams and rational behavior, history of metapsychological concepts, and personality development. Part 2 is concerned with clinical problems in psychiatry. In this section are articles on neuroses, behavior disorders and perversions, acute neurotic reactions (based on the study of war neuroses), emotional disorders of childhood, psychodynamic approach to the study of the psychoses, and principles of psychiatric treatment. Part 3 is concerned with the influence of psychoanalysis on allied fields. It includes articles on medicine, social anthropology, clinical psychology, animal psychology, and current thought. The book is intended not for the lay public but as a reference book for psychiatrists, psychoanalysts, physicians who are interested in the principles of psychodynamics, psychologists, and social scientists. It is a scholarly and comprehensive presentation, skillfully prepared and edited, which includes a wealth of information that is not contained elsewhere in one volume. The authors have given almost 1,000 references. They have rendered a real service by their respective contributions.

The reviews here published have been prepared by competent authorities and do not represent the opinions of any official bodies unless specifically stated.

Manic-Depressive Psychosis and Allied Conditions. By Leopold Bellak, M.D., Clinical Assistant Professor of Psychiatry, New York Medical College, New York, with Blaise Pasquarelli, M.D., Research Associate, New York State Psychiatric Institute, New York, Ernest Parkes, M.A., Instructor in Psychology, New York University, New York, Sonya Sorel Bellak, and the collaboration of Sydell Braverman, M.A. Foreword by Winfred Overholser, M.D. Cloth. $9.75. Pp. 306. Grune & Stratton, Inc., 381 Fourth Ave., New York 16, 1952.

This book summarizes the literature on manic-depressive psychosis and related disorders, much of which is considered by the authors as not being readily or easily available to psychiatrists. The work was, in part, sponsored by a grant from the National Institute of Mental Health of the United States Public Health Service. The authors mention more than 1,000 studies of affective disorders and provide adequate bibliographic reference to them with the stated purpose of providing an incentive to further work in this field rather than the presentation of a critical review.

The book is divided into two parts. The first part discusses diagnosis, treatment, and prognosis of manic-depressive psychosis, and the second part relates to allied conditions, such as involutional psychosis, reactive depression, depression of old age, and psychotic reactions to pregnancy. Additionally, the author discusses his own multiple-factor psychosomatic theory of manic-depressive psychosis and relates it to a parallel theory of causation in schizophrenia. The summary of the literature will be important to those interested in research, as it cites, in brief form, the statements that have been made by previous investigators of the affective disorders. From this point of view, the volume makes a contribution of considerable value.

The Thoracic Surgical Patient—Preoperative, Anesthetic and Postoperative Care. By Lew A. Hochberg, M.D. Foreword by Frank B. Berry, M.D. Cloth. $8.75. Pp. 364. Grune & Stratton, Inc., 381 Fourth Ave., New York 16, 1952.

This book has been written in the main by Hochberg; however, six other specialists have collaborated in writing specific sections of the book. Some of the chapters are repetitive; however, this is no drawback and in some instances accentuates some necessary points and procedures. Some might disagree with certain statements made, but the basic teachings and precepts are well presented and should go far to produce good results. The emphasis upon such ofttimes neglected subjects as anesthesia, nutrition, fluid balance, blood replacement, resuscitation, and rehabilitation makes this work worthwhile. The section dealing with physiology and pathological physiology is particularly well done.

It is regrettable that illustrations are lacking since there are numerous opportunities in this book to have used simple line drawings; these might have emphasized numerous points.

The quality of the paper could have been improved on. The book can be recommended for both undergraduates and postgraduates interested in thoracic surgical patients.

As bases anátomo-patológicas da neuriatria e psiquiatria. Volumes I e II. Por Walter Edgard Maffei, D.M., Livre-docente de anatomia patológica, patólogista do Hospital Juqueri (Franco da Rocha, Est. S. Paulo). Cloth. Pp. 491, with 345 illustrations; 494, with 410 illustrations. Imprensa Metodista, Rua da Liberdade 659, São Paulo, 1951.

The author, a distinguished neuropathologist from the University of São Paulo and its associated hospitals, is fully qualified to write on the subject of the pathological changes in the nervous system resulting from injury, disease, and developmental anomalies. His material, based on 16,000 autopsies, is abundant, and his laboratory facilities are excellent. The book covers the usual topics of degenerations, inflammations, disorders of circulation, with long chapters on syphilis, tumors, peripheral nervous disease, meningitis, trauma, and parasitic infections. An alphabetical index is provided, but only a few references to the literature are included as footnotes, without a complete bibliography. Over

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800 well-produced illustrations greatly add to the value of the text, particularly for those readers who cannot read Spanish fluently. As the author was trained in France, his background is frequently reflected by references to French literature.

The volumes, well bound and serviceable, are printed with care on good paper. They are a splendid contribution to the subject, of special value to physicians in North America because of the abundant illustrations, the diagrams drawn by the author, the sections on parasitic diseases, and the scholarly text. This monograph should be in all pathology laboratories and medical libraries.

The Welfare State and the National Welfare: A Symposium on Some of the Threatening Tendencies of Our Times. Edited, with introduction, by Sheldon Glueck, Roscoe Pound Professor of Law, Harvard Law School, Cambridge. Cloth. $3.50. Pp. 289. Addison-Wesley Press, Inc., Kendall Sq., Cambridge 42, Mass., 1952.

National social and economic policy has been the subject of contemplation by persons of all nations since the beginning of time. Never before in the history of the United States has it been so important to decide not only which road we will take but how far down that road we will go. A symposium of addresses and articles dealing with some of the more questionable politico-economic trends in the last decade has been compiled and edited, with an introduction by Sheldon Glueck, under the title "The Welfare State and the National Welfare." The contributing authors, statesmen, educators, lawyers, engineers, economists, and journalists, are men from both sides of the political fence who are compelled by their feeling of public responsibility to raise their voices in protest. The book includes articles by Bernard Baruch, Vannevar Bush, Harry F. Byrd, Donald K. David, John Foster Dulles, Dwight D. Eisenhower, Herbert Hoover, Raymond Moley, Edwin G. Nourse, Roscoe Pound, Donald Richberg, Walter E. Spahr, and the editors of *Life*. While each has a different emphasis, all agree that unless some reasonable and clear limits are placed on the conception of what the general welfare is and to what extent our financial future can be mortgaged to carry out this illusion of security we are in grave danger of national bankruptcy. National bankruptcy is just a symptom of the disease that is eating away at the American heritage and will continue to spread if we are willing to legislate away our personal liberties for a feeling of false security and propel ourselves down the road to a welfare state.

Are we losing any liberties? Let us figure it out in dollars and cents. Taxes and federal expenditures took $31.60 from every man, woman, and child in 1929. This amount increased to $268.23 per person in 1948 and in the face of proposed increases could easily amount to nearly $500.00 in 1952. If we add state and local taxes to federal taxes, the annual tax obligation of the American public would be more than 40 cents out of every dollar they earn. Where is the savings or surplus that starts businesses, builds churches, and finances education and retirement. There is none. In the face of these social necessities the welfare state steps in to do it for us, and these are then under the control of the government. The welfare state simply offers to do for us what we can do better, more cheaply, and with greater satisfaction for ourselves. What becomes of our freedom when it is decided for us where, how much, and by whom our money will be spent?

It is a delusion to think that we can buy security and can still retain our liberties simply by paying high taxes. There can be no security for persons whose livelihood depends on political favor and political pressure. In order to have an effective planned or welfare state there must be control of the factors of production by the planners, in this case the government, and this is the very definition of national socialism. As Richberg states, ". . . a comprehensive welfare state must be a police state."

It is the use of so-called democratic methods to achieve inroads to a planned economy that deceives and confuses public opinion. Ambiguous wording in campaigns of special interest groups paint beautiful pictures, but when the paint dries we find we have mortgaged our personal liberties for a controlled state. During this year of national elections, we have a chance to decide if the present trend should continue. We must individually and collectively look beyond special, regional, or personal interests and see where we want to go. America must choose.

Medical Nursing. By Amy Frances Brown, R.N., M.S. in N., Associate Professor of Medical Nursing, State University of Iowa College of Nursing, Iowa City. Second edition. Cloth. $5.50. Pp. 1099, with 387 illustrations. W. B. Saunders Company, 218 W. Washington Sq., Philadelphia 5; 7 Grape St., Shaftesbury Ave., London, W.C.2, 1952.

This second edition, like the first, is intended to enable the student nurse to give more effective and complete care to medical patients. The author has had wide experience as an educator in the field of medical nursing. In this edition, new chapters have been added on poliomyelitis, viral hepatitis, convalescence, rehabilitation, radiological nursing, and anti-infectious agents. The features that characterized the first edition have been given greater emphasis in this edition. Stress is on nursing care, the consideration of the patient as an individual and his need for total care, the problem of the chronically ill and aged, the teaching of patients, the integration of pharmacology, and the selection of appropriate illustrations. Attention has been given to sociologic, economic, and emotional factors as they affect the health picture of individuals or groups.

The book is divided into 11 units that include diseases of the respiratory system, the cardiovascular-renal system, the digestive system, the skin, the endocrine system and metabolism, and the nervous system. There are also sections on nutritional deficiency disease, the arthritides, allergy, and communicable disease. The illustrations consist of photographs, some in color, and diagrams, charts, and graphs. All chapters are followed by a bibliography.

This is a comprehensive text. Modern diagnosis and treatment are clearly and concisely discussed to a degree that will enable the student to develop an understanding of them as a basis for nursing care. Emphasis is, however, placed on the role of the nurse in patient care. This approach is logical and practical and does much to make this text useful for student nurses.

Attaining Manhood: A Doctor Talks to Boys About Sex. By George W. Corner, M.D., Director, Department of Embryology, Carnegie Institution of Washington, Washington, D. C. Second edition. Cloth. $1.50. Pp. 97, with 16 illustrations. Harper & Brothers, 49 E. 33rd St., New York 16, 1952.

Attaining Womanhood: A Doctor Talks to Girls About Sex. By George W. Corner, M.D., Director, Department of Embryology, Carnegie Institution of Washington, Washington, D. C. Second edition. Cloth. $1.50. Pp. 112, with 15 illustrations. Harper & Brothers, 49 E. 33rd St., New York 16, 1952.

Referred to as companion volumes, these book follow essentially the same pattern of presentation. Each consists of eight chapters, and topics common to both books are the human reproduction system, attainment of maturity, sex attraction, sex conduct, and the scientific study of sex and reproduction. In the volume for boys, the chapter dealing with venereal diseases is called sex disorders, whereas a similar chapter in the book for girls is simply designated as venereal disease. As the author points out, either volume would provide satisfactorily basic information for either sex, but there is good reason for avoiding a composite publication. The books are written in a frank, friendly style without any pompous warnings, and explanations are simple yet entirely adequate. A point on which the author should be commended is his use of correct terms, preferring, as he says, to depend on the intelligence of his readers in discussions in which simpler language would not be accurate. Both volumes are adequately provided with instructive illustrations; there are 15 in the book for girls and 16 in the book for boys. These publications can be recommended to high school students; they would undoubtedly also be of considerable value to many parents whose background of information in this field is hazy or incomplete.

Good Food and Bad Stomachs: 500 Delicious and Nutritional Recipes for Sufferers from Ulcers and Other Digestive Disturbances. By Sara M. Jordan, M.D., and Sheila Hibben. With introduction by Harold W. Ross. Cloth. $2.95. Pp. 255. Doubleday & Company, Inc., Garden City, New York, 1951.

This is a useful and encouraging book of recipes and directions for preparing foods for patients with peptic ulcers and those who have other gastrointestinal disturbances requiring a bland and nonirritating diet. Aside from its thoroughly scientific character and complete reliability, it possesses a virtue by no means common in dietetic cookbooks; namely, it places emphasis on the attractiveness of the diet.

Text-Book of Orthopædic Medicine. Volume II: Treatment by Manipulation and Deep Massage. By James Cyriax, M.D., B.Ch., Physician to Department of Physical Medicine, St. Thomas's Hospital, London. Fourth edition. Cloth. $6. Pp. 335, with 121 illustrations. Paul B. Hoeber, Inc., (medical book department of Harper & Brothers), 49 E. 33rd St., New York 16, 1951.

The text is extremely well illustrated and discusses methods of massage and manipulation and their usefulness in a vast number of conditions pertaining particularly to the musculoskeletal system. Although some techniques of massage and manipulation that are acceptable are discussed, it is difficult to understand why a textbook of orthopedic medicine contains sections on manual vibrations for affecting the pylorus, duodenum, ascending colon, descending colon, and distention of the stomach. Another technique directed toward reproducing "fixed subluxation of the sacroiliac joint" will not be too well received by those who question the existence of such a condition.

The text seems to be overenthusiastic in its indication of the value of massage and manipulation, but, in spite of this, it does clearly present various techniques for the treatment of parts of the musculoskeletal system. The book appears to be written especially for physical therapists.

Map of the World Distribution of Malaria Vectors. By Jacques M. May. Reprinted from Geographical Review, Volume XLI, no. 4, 1951. Paper. Pp. 638-639. American Geographical Society, Broadway at 156th St., New York 32, 1951.

Map of the World Distribution of Cholera. By Jacques M. May. Reprinted from Geographical Review, Volume XLI, no. 2, 1951. Paper. Pp. 272-273. American Geographical Society, Broadway at 156th St., New York 32, 1951.

Map of the World Distribution of Poliomyelitis. By Jacques M. May. Reprinted from Geographical Review, Volume XL, no. 4, 1950. Paper. Pp. 646-648. American Geographical Society, Broadway at 156th St., New York 32, 1950.

These maps form part of a projected "Atlas of Diseases" instituted by the American Geographical Society, a professional organization of geographers that is especially interested in medical geography. The first map, prepared with the assistance of a grant from the National Foundation for Infantile Paralysis, includes data on morbidity rates for poliomyelitis since 1900, regional differences in the age group predominantly attacked, epidemics among military personnel, and percentage of positive reactions to neutralization tests in selected areas. The sources of information are appended. The second map shows the world distribution of the various types of malaria parasites and of the mosquito vectors. Also included are brief notes on the epidemiology of malaria, a résumé on the natural history of the vectors, and a selected bibliography. The third map shows the endemic foci of cholera, the routes of spread of the first four pandemics of cholera, the outbreaks of cholera between 1923 and 1950, monthly occurrences of cholera in India, and the 1947 Egyptian epidemic.

This series of maps should be of great interest to teachers and students of epidemiology and to all others wishing information concerning the incidence of important diseases in various parts of the world.

Fluid Balance: A Clinical Manual. By Carl A. Moyer, M.D., Professor of Surgery, Washington University School of Medicine, St. Louis. Cloth. $3.75. Pp. 191, with 1 illustration. Year Book Publishers, Inc., 200 E. Illinois St., Chicago 11, 1952.

This manual is described by the author as a practical guide to fluid and electrolyte imbalances, with their changes of volume and composition of the body fluids and the symptoms and signs that they produce. The subject is concisely reviewed. Clear-cut descriptions of many problems of electrolyte and water imbalance are discussed in brief form.

The subject is covered by the author from a primarily surgical viewpoint. Emphasis is placed on postoperative complications. Some medical conditions with outstanding problems of fluid balance are mentioned in passing. The changes in extracellular fluid volume and composition are described and illustrated by reports of cases. Some original and useful concepts are included. The coverage of disturbances of ions other than sodium, chloride, and bicarbonate ions is incomplete; an example is the omission of mention of the neuromuscular signs of potassium intoxication. Treatment is clearly outlined and documented by illustrative cases. This should be a useful handbook for the surgeon, but it will be of somewhat less interest to the general physician because of the limited coverage of problems associated with medical disease.

Thomas Jefferson: Scientist. By Edwin T. Martin. Cloth. $4. Pp. 289, with illustrations. Henry Schuman, Inc., Publishers, 20 E. 70th St., New York 21, 1952.

This book is representative of the vast amount of scholarly research on Jefferson that has been going on since his bicentennial in 1943. It provides a fascinating account of a great American president's intellectual curiosity, which brought him into intimate relation with an extraordinary range of scientific fields: botany, geology, medicine, meteorology, agriculture, architecture, astronomy, chemistry, paleontology, ethnology, exploration, invention, and archeology. In these diverse fields Jefferson's insatiable thirst for knowledge was coupled with the desire that the benefits of science be made available to his fellow men so that their lot might be progressively bettered. But perhaps more important than his search for daily application of scientific knowledge to useful social ends was Jefferson's ardent championship of the freedom of scientific inquiry. He maintained that circumscribing free scientific inquiry could only retard "all advances in science as dangerous innovations." Throughout his long life Jefferson expressed a profound belief in "the illimitable freedom of the human mind." This book is highly recommended.

Kinesiology in Nursing: Laboratory Manual. By Bernice Fash, M.A., University of Illinois, Cook County School of Nursing. McGraw-Hill Series in Nursing, Lucile Petry, consulting editor. Paper, Loose-leaf. $2.80. Pp. 142, with 102 illustrations by Paul H. Stone. McGraw-Hill Book Company, Inc., 330 W. 42nd St., New York 18; Aldwych House, Aldwych, London, W.C.2, 1952.

In this book, a detailed application of anatomy and physiology to the problems of posture and exercise for patients is discussed. The author has considered these problems from both viewpoints, namely that of the patient in danger of weakness, deformities, and bedsores and that of the nurse confronted with the equally real dangers of disabling overstrain. The illustrations, which at first strike the reader as unconventional, are soon appreciated as remarkably illuminating; they make the book extremely valuable. It is hoped that in some future edition the author will break further with convention by getting rid of the illogical adjectives "concentric" and "accentric" as applied to certain kinds of muscular activity (page 9). This book should be available in the library of every school of medicine and nursing.

Introduzione alla biometria. Di G. Barbensi, Ars medica, collana diretta dal Prof. Vincenzo Lapiccirella. Cloth. 3000 lire. Pp. 418, with illustrations. Vallecchi editore, Viale dei Mille, 90, Florence, 1952.

The author undertakes to present to biologists an easy exposition of statistical methods useful in their specialty. Interspersed in the smoothly written text are 133 numerical problems from various fields of biology and medicine. Author and publisher have cooperated in producing a remarkably legible book in which one readily finds most of the concepts that have become familiar in current textbooks: probability, graphic representation, measures of central tendency and of dispersion, asymmetry and kurtosis, correlation and contingency, interpolation, regression, and variance and covariance. There are useful tables, a brief bibliography that does justice to foreign publications, an index, and a table of contents.

The book is written more for the observer than for the experimenter, with examples chosen more from anthropometry than from experimental therapeutics. As a result there is little emphasis on the important idea of the contratest, contre-essai, or control, an idea that will require much further emphasizing before it is sufficiently appreciated in clinical research. This deficiency can easily be remedied in future editions, which are to be anticipated in view of the general excellence of this book.

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QUERIES AND MINOR NOTES

REMOVAL OF TRACHEOTOMY TUBES

TO THE EDITOR:—*In a hospital there is a difference of opinion regarding the proper time to attempt extubation following tracheotomy done for acute nondiphtheritic laryngitis and regarding the procedure to be followed. What is your opinion?*

M.D., Pennsylvania.

This inquiry was referred to two consultants, whose respective replies follow.—ED.

ANSWER.—It seems obvious that a tracheotomy tube should be left in place as long as it is required; however, the decision concerning when to remove it usually rests with the operator. In acute conditions, when tracheotomy is indicated, there is generally edema about the glottis. Under such circumstances, the edema subsides with appropriate treatment, as a rule, within a few days, and the tube can be withdrawn at the end of a week or 10 days at the most. A common fallacious practice among residents training in their specialties is to gradually block off the mouth of the tube with adhesive tape or by other means to determine if the patient has a free airway. If the tube happens to fit snugly into the trachea, complete blocking of its protruding end should cause asphyxiation of the patient. If the patient continues to breath it is only because the tube is small enough to permit air to pass along its sides into the lungs. Even under the latter condition the physician is demanding that there be normal breathing with a foreign body (tracheotomy tube) in the respiratory tract. At one time, tracheotomy tubes with a "window" in the shoulder were frequently used. With such a tube, blocking of the external orifice would indicate properly whether there was a free passage of air through the glottis and the tube into the lungs. In some cases of laryngotracheobronchitis and in bulbar poliomyelitis there may be profuse secretions that require frequent aspiration for a considerable time. As a consequence, it may be desirable to leave the tube in place much longer than for most acute infections. Nevertheless, the tube should be removed as soon as this can be done with safety. Cases have been observed in which it was necessary for the patient to use a tracheotomy tube for many years after the acute infection had subsided.

The presence or absence of edema about the glottis can be determined by palpation. It is sometimes advisable to make such an examination before removal of the tube, although inspection with a laryngoscope is generally preferred. After removal of the tube a piece of sterile gauze may be laid over the opening until it becomes apparent that a reinsertion of the tube will not be necessary. The skin surfaces often can be approximated with adhesive tape instead of sutures. The wound heals rapidly.

ANSWER.—No positive time interval can be established for extubation following tracheotomy for any cause. In acute nondiphtheritic laryngitis, tracheotomy is done to pipe air into the trachea below an obstructed larynx and the tube can be removed only after the obstructing edema and inflammation subsides. This may take 2 or 3 days or a week to 10 days. It is usually more difficult to extubate small infants than older persons, because slight, persisting edema in a small infant causes a high degree of airway obstruction, whereas the same persisting edema in the larynx of an older person will cause a relatively small degree of obstruction.

Several extubation procedures are available. The simplest is to reduce the size of the tracheotomy tube during the daily changes of the tube after the third or fourth day; for example, if the patient was tracheotomized with a no. 2 tube, the tube size should not be changed until toxemia subsides and the temperature and condition of the chest are normal, which, in acute nondiphtheritic laryngitis, usually occur after the third to the seventh day. Then a no. 1 tube should be substituted for the no. 2 and on the next day a no. 0 tube for the no. 1, provided there is no return of obstructive symptoms. Finally, the small tube may be corked with a partial or complete rubber cork or the inner tube may be closed with an adhesive tape cover to encourage resumption of mouth breathing. In the meantime, the fistulous tract for reinsertion of the tube in case the airway is not yet adequate is maintained. If the patient can sleep through the night with the tube plugged, the tube may be removed and the fistula will usually close spontaneously. Close observation of the patient is necessary during this time so that the airway may be reopened, if necessary, by removing the rubber cork or the adhesive tape covering the inner tube. Another technique is to substitute a small diameter blind extubation plug for the tracheotomy tube for a 24 hour test period after the acute process has subsided, thus maintaining the tracheostomy while reestablishing mouth breathing.

MEPHENESIN CONTRAINDICATED IN NERVOUS DRIVERS

TO THE EDITOR:—*A professional driving instructor is confronted with a large number of nervous students. Many of these students have acute symptoms, with noticeable tremors and increase in tension, at the time of their examination by the motor vehicle department for a driver's license. Would mephenesin be useful in decreasing the nervous tension and thus improving the driving of these students at the time of examination? What dangers, if any, would be involved in its use?* *John H. Kennard, M.D., Manchester, N. H.*

ANSWER.—Mephenesin was introduced by Berger and Bradley, in 1946, as a drug capable of producing muscular relaxation without loss of consciousness. Kaada's studies showed the site of action of the drug to be the internuncial neurons of complex polysynaptic circuits. Gammon and Churchill have shown that there is also depression of subcortical and cortical activity. The drug has been used in a variety of clinical syndromes with varying degrees of success. It has been noted to reduce tremors and to produce a sedative effect in certain cases. The drug is not, however, without side-effects; the most frequently observed have been sleepiness and dizziness. Laurence has also reported temporary collapse, fecal incontinence, and vomiting following ingestion of the drug. It would appear, therefore, that while some of the described symptoms might be alleviated by this drug, the side effects would contraindicate its use by anyone driving an automobile.

PERIODIC DIARRHEA

TO THE EDITOR:—*A patient has had repeated episodes of diarrhea, which are apparently caused by Endolimax nana infection. The patient has received aureomycin and several courses of diiodohydroxyquinoline (diodoquin®), with no permanent cure resulting. Inevitably, the cysts of the organism reappear in one to three months. I would appreciate suggestions regarding treatment.* *M.D., Illinois.*

ANSWER.—Endolimax nana is not generally considered to be a pathogen, and one should be cautious about attributing gastrointestinal symptoms to this parasite. It is commonly found in routine examination of stool specimens. If thorough gastrointestinal studies, including a complete roentgenographic series, gastric analysis, and proctosigmoidoscopy as well as examination of the stools for fat content and muscle fibers, do not reveal a demonstrable organic cause for the diarrhea, psychogenic factors should be considered in the diagnosis of relapsing or periodic diarrhea.

The answers here published have been prepared by competent authorities. They do not, however, represent the opinions of any official bodies unless specifically stated in the reply. Anonymous communications and queries on postal cards cannot be answered. Every letter must contain the writer's name and address, but these will be omitted on request.

REDUCING DIET FOR HYPOGLYCEMIC PATIENTS

TO THE EDITOR:—*Please outline a reducing diet for a patient with hypoglycemia.* *F. H. Corpening, M.D., Horse Shoe, N. C.*

ANSWER.—The diet for an overweight patient with hyperinsulinism (spontaneous hypoglycemia) differs little from the low-calorie (1,250 calories) reducing diets generally prescribed by physicians. It should be low in carbohydrates and high in proteins, with a limited amount of fats. The ingested food should be divided into three small meals a day, an egg for breakfast, fish or other seafood, or cheese and crackers for lunch, and lean meat in liberal quantities for dinner. An abundance of vegetables containing 3 or 5% carbohydrate may be eaten for lunch and dinner. Fruit or fruit juices (orange, apple, or grapefruit) should be taken for breakfast, every two or three hours between meals, at bedtime, and, if awake, during the night.

The following diet has been used successfully in many overweight hyperinsulin patients:

Breakfast.—One fruit: half a grapefruit, an orange, or orange juice, half of a cantaloupe, peaches, or any other fruit in season, without sugar; one egg, cooked any way except fried; one slice of whole wheat bread toast; one pat of butter; and one cup of coffee without sugar if one usually drinks coffee.

Dinner.—Soup: cold or jellied chicken or beef consomme or tomato juice. Green vegetables (one or two varieties): large serving of spinach, turnip greens, mustard greens, tender string beans, cabbage, squash, egg plant, okra, carrots, cauliflower, brussels sprouts, or onions, cooked without grease. Lemon juice may be used freely on vegetables after they have been cooked.

Meat: a large portion of chicken, turkey, mutton, roast beef, tender steak, thinly sliced boiled ham, or fish, cooked without much grease. Trim fats from meats. Bread: one slice of whole wheat bread, dry toast, a small piece of country-ground corn meal bread, or one small corn muffin.

Dessert: peaches, baked apple, or other fruit or berries with milk but no sugar, cantaloupe, a small piece watermelon, or other fruit desserts.

Luncheon or Supper.—Fish, shrimp or other seafood, or any cheese. Fruit or uncooked vegetable: large serving of lettuce, cole slaw, tomato, grapefruit, or waldorf salad. French dressing may be used. Celery and radishes. Bread: one slice of whole wheat bread or toast, and one pat of butter. A glass of buttermilk or skimmed milk. Dessert: an orange, cantaloupe, baked apple without sugar, or other fresh fruit desserts without sugar may be eaten.

Regulating the life of the hyperinsulin patient is important. He should be particularly careful to avoid fatigue and requires rest in bed eight or nine hours at night and from half an hour to an hour after the noon meal. He should drink not more than one cup of coffee a day. It is particularly important to eliminate sweets and cane sugar products of all kinds, since they stimulate the secretion of insulin and are, therefore, harmful. The cola-caffeine containing soft drinks are an important cause of hyperinsulinism and should be eliminated entirely. Beer and all other alcoholic beverages, when used regularly or in excessive amounts, because of their effect on the liver, cause spontaneous hypoglycemia (relative hyperinsulinism). Total abstinence is advisable in all cases of hyperinsulinism.

INFECTIOUS HEPATITIS AND PREGNANCY

TO THE EDITOR:—*Is a therapeutic abortion indicated in a woman who is five months pregnant and has severe infectious hepatitis? She is doing well clinically, and her serum bilirubin has steadily declined from 12 mg. per 100 cc. to 2 mg.*

M.D., Tennessee.

ANSWER.—The only consideration is whether the hepatitis is severe enough to indicate abortion. Since this patient is improving, abortion does not appear indicated. There are apparently no reports of the disease affecting the offspring in utero. In general, if the patient is in good condition and on a high protein diet, there should be no undue strain on the liver. More rest, however, is required, and a considerable length of time is necessary for the patient to regain her strength and tolerance to exercise.

DIFFERENCE OF BLOOD PRESSURE IN THE ARMS

TO THE EDITOR:—*A man, aged 28, had been turned down for insurance because of hypertension. He has since been insured, because on succeeding occasions his blood pressure was normal. On the day he was found to have hypertension, the pressure was determined on his left arm, whereas it had always been taken on the right arm previously. The reading of his left arm was 160/105 and of the right arm, 128/80. At subsequent examinations, it has been the right arm that is hypertensive, 170/110, and the left arm has given a reading of 130/80. Is there any known cause for this phenomenon? Could it be a one-sided autonomic nervous system imbalance? Gross tests for the scalenus anticus syndrome are negative.*

Robin Smith, M.D., Neenah, Wis.

This inquiry was referred to two consultants, whose respective replies follow.—ED.

ANSWER.—Differences in blood pressure in the two arms are frequent enough to warrant routine determinations on both sides. Angulation of or pressure on the aortic branches and the aortic plaques, or partial occlusion may account for differences between the two sides; also, in some patients the first determination of blood pressure yields higher figures than subsequent ones. It is likely that such a patient has increased vasomotor reactivity. He should be watched for the development of a continuous diastolic hypertension.

ANSWER.—It is probable that this patient consciously or unconsciously is applying pressure to the artery. It would be interesting to measure arterial pressure with the arms at different angles to the body. The suggestion that the blood pressure differences are due to autonomic imbalance seems unlikely.

PAROTITIS AND RHEUMATOID ARTHRITIS

TO THE EDITOR:—*A woman, aged 50, has a mixed type of arthritis. One year ago she had a series of 20 gold treatments. On the date of the 20th treatment, painful swelling of both parotid glands developed. The physician who gave her the gold injections told her she had mumps. The glands were so large that they produced facial disfigurement. The patient also complained of dryness of the mouth. No tenderness of the large and firm parotid glands was elicited. There was no history of infection or other glandular disease. The patient was given weekly x-ray treatments of 100 r each directed to each parotid gland through a 6 by 8 cm. port tangentially. Six treatments, a total of 605 r, were given to the left parotid gland, and seven treatments, a total of 705 r, were given to the right parotid gland. There was complete regression of the swelling in both glands and less dryness of the mouth six weeks after the last treatment. Could the gold injections have caused the bilateral chronic parotitis?*

M. L. Pindell, M.D., Beverly Hills, Calif.

ANSWER.—This consultant has never known disease of the parotid glands to develop as a consequence to or complication of gold therapy or rheumatoid arthritis. It is highly possible that this patient had inflammation of the parotid glands as one of the infrequent nonarticular disorders seen in patients with rheumatoid arthritis. Such disease of the salivary and lacrimal glands has been described by Sjogren and is sometimes referred to as Sjogren's disease. It is described in a recent article by Reader and co-workers (*Ann. Rheumat. Dis.* **10:**288 [Sept.] 1951).

SEROUS DISCHARGE FROM THE NIPPLES

TO THE EDITOR:—*In* THE JOURNAL *April 5, 1952 (page 1261), a query concerning a 34-year-old woman who has had at intervals a serous discharge from the nipples makes no mention of whether she has had any pregnancies. Occasionally, women who have had pregnancies show, in later years, a discharge from one or both nipples, which is nonsanguineous and in which no malignant cells can be recognized or other abnormal cytological condition detected.*

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